13th International Couette-Taylor Workshop

Nonlinear Dynamics in Fluids

Barcelona, July 3-5, 2003

PROGRAMME

Workshop Program

Wednesday July 2, from 18:00 to 21:00, Registration.

	Thursday, July 3	**Friday, July 4**	**Saturday, July 5**
8:15	Registration	Registration	
9:00	Session 1A Opening Taylor-Couette flows I	Session 2A Thermal Convection	Session 3A Miscellanea
11:00	Coffee Break	Coffee Break	Coffee Break
11:20	Session 1B Taylor-Couette flows II	Session 2B Rotating Flows	Session 3B Taylor-Couette Flows III
13:00	Lunch	Lunch	Lunch
14:30	Session 1C Invited talk Shear Flows	Session 2C Invited talk MHD and Dynamo Effect	Session 3C Invited talk Taylor-Couette Flows IV
16:00	Coffee Break	Coffee Break	Coffee Break
16:20	Session 1D Shear Flows (continuation)	Session 2D Geophysical Spherical TC Flows	Session 3D Taylor-Couette Flows V
18:00		Poster Session	Closing
20:00	**Reception**	**Banquet**	

Invited Speakers:

- Prof. **Friedrich H. Busse**, Chair of Theoretical Physics IV, University of Bayreuth. *Convection in rotating spherical shells and its dynamo action.*
- Prof. **Edgar Knobloch**, University of Leeds and University of California, Berkeley. *Imperfections and dynamics.*
- Prof. **Tom Mullin**, Director of the Manchester Centre for Nonlinear Dynamics, University of Manchester. *Taylor-Couette Flow; the long and the short of it.*

Schedule:

Thursday, July 3, 2003

8:15 Registration

9:00 Welcome (Workshop Organizers)

Session 1A: Taylor-Couette flows I. Chair: Masato Nagata.

09:20 Oscillating Taylor-Couette Flow, Daisuke Takada and Yasushi Takeda.

09:40 Reversing and non-reversing modulated Taylor-Couette flow, A.J. Youd, A.P. Willis, C.F. Barenghi.

10:00 Interaction of the Ekman Layer with Vortical Flow in a Short Couette-Taylor Cell, Olivier Czarny, Eric Serre, Patrick Bontoux, and Richard M. Lueptow.

10:20 Experimental study of the interactions of coupled counter propagating spirals in a viscoelastic Couette-Taylor flow, Olivier Crumeyrolle, Noureddine Latrache, Alexander Ezersky, Innocent Mutabazi.

10:40 Investigation of the effect of acceleration on Taylor vortex flow using MCCDPIV, Julio Soria, K.D. von Ellenrieder, T.T. Lim and Y.T. Chew.

11:00 Coffee Break

Session 1B: Taylor-Couette flows II. Chair: Tom Mullin.

11:20 Spirals and Standing Waves in counterrotating Taylor-Couette Flow, J. Langenberg, J. Abshagen and G. Pfister.

11:40 Counterrotating Taylor-Couette flow with axial throughflow, M. Heise, J. Langenberg, G. Pfister.

12:00 Vortex doubling in a wavy-walled Taylor-Couette apparatus, Anne Staples and Alexander J. Smits.

12:20 Effects of Small Deformation of Inner Cylinder on Taylor-Couette Flow in Turbulent Regime, M. Soos, H. Wu and M. Morbidelli.

12:40 An asymmetrical periodic vortical structures and appearance of the self-induced pressure gradient in the modified Taylor flow, S. Drozdov, S. Skali-Lami, M. Rafiqe.

13:00 Lunch

Session 1C: Shear Flows. Chair: Laurette Tuckerman.

14:30 **Invited talk:** Imperfections and dynamics, Edgar Knobloch.

15:20 Minimal plane Couette flow turbulence: a low-dimensional, uncoupled model, Troy R. Smith, Jeff Moehlis, Philip Holmes.

15:40 Spots and turbulent domains in a model of transitional plane Couette flow, Paul Manneville.

16:00 Coffee Break

Session 1D: Shear Flows (continuation). Chair: Paul Manneville.

16:20 Numerical simulation of banded turbulence in plane Couette flow, Dwight Barkley, Laurette S. Tuckerman.

16:40 Rotating shear flows and subcritical turbulence, Pierre-Yves Longaretti.

17:00 Time-dependent solutions in rotating/non-rotating plane Couette flow, Masato Nagata, G. Kawahara.

17:20 Unstable manifolds computation for the two-dimensional plane Poiseuille flow, Pablo S. Casas, Angel Jorba.

17:40 Travelling waves and transition to turbulence in pipe flow, Holger Faisst, Bruno Eckhardt.

20:00 Reception

Friday, July 4, 2003

8:15 Registration

Session 2A: Thermal Convection. Chair: Friedrich H. Busse.

09:00 Influence of aspect ratio in thermal convection in a cylindrical annulus, S. Hoyas, A.M. Mancho, H. Herrero.

09:20 Natural Convection in rotating Spherical gap under the central Force Field, Vadim Travnikov, Rainer Hollerbach, Christoph Egbers.

09:40 Standing and traveling waves in Rayleigh-Benard convection in cylindrical geometry, Katarzyna Boronska, Laurette S. Tuckerman.

10:00 Thermocapillary-buoyant convection in laterally heated liquid layers, Santiago Madruga, Carlos Pérez-García, Georgy Lebon.

10:20 Complex dynamics in double-diffusive convection, Esteban Meca, Isabel Mercader, Oriol Batiste, Laureano Ram´1rez-Piscina.

10:40 Transition to chaotic patterns in Rayleigh-Bénard convection in rotating cylinders, E. Serre, E. Crespo del Arco and F. H. Busse.

11:00 Coffee Break

Session 2B: Rotating Flows Chair: Eric Serre..

11:20 Centrifugal instability development near critical line of cylinder placed in supersonic flow, Igor I. Lipatov. **Canceled.**

11:40 Excitable modes in forced symmetry breaking for a cylindrical container with one rotating endwall, Yiannis Ventikos.

12:00 Heteroclinic cycles and Kelvin-Helmholtz instability in the flow between exactly couner-rotating disks, Caroline Nore, Laurette S. Tuckerman, Olivier Daube, Shihe Xin.

12:20 Influence of Rim-Shroud Clearance on Flow around Rotating Disc in Cylindrical Enclosure, Aoi, Kashimoto, Morisue, Nakamura, Watanabe.

12:40 The transition to turbulence of the torsional Couette flow, A. Cros and P. Le Gal.

13:00 Lunch

Session 2C: MHD and Dynamo Effect. Chair: Edgar Knobloch.

14:30 **Invited talk:** Convection in rotating spherical shells and its dynamo action, Friedrich H. Busse.

15:20 Magneto-rotational instability and dynamo action in hydromagnetic Couette flow, A.P. Willis and C.F. Barenghi.

15:40 On a subcritical transition scenario for pipe flow, Alvaro Meseguer.

16:00 Coffee Break

Session 2D: Geophysical Flows and Spherical TC Flows. Chair: Dwight Barkley.

16:20 MHD Taylor-Couette flow theory for small magnetic Prandtl number and with Hall effect, Guenther Ruediger.

16:40 Baroclinic instabilities in a thermally driven rotating annulus, T. von Larcher, C.V. Egbers.

17:00 Finite Amplitude Subcritical Instability in Narrow-gap Spherical Couette Flow, Andrew Soward, Andrew Bassom.

17:20 Heteroclinic cycles in the Geoflow-experiment on the International Space Station, Ph. Beltrame, Ch. Egbers, V. Travnikov.

17:40 Instabilities of the Stewartson Layer, Rainer Hollerbach.

18:00-18:30 Session 2E -- Poster Session

- Flows regimes in a Taylor-Dean system with a superimposed Poiseuille flow, A. Ait Aider, S. Skali, J.P. Brancher & G.Maurice.
- Hydromagnetic Convection in the Rotating Cylindrical Annulus with Azimuthal Magnetic Field, E. Kurt, F.H. Busse and W. Pesch.
- Effect of finite width on the onset of binary fluid convection, Arantxa Alonso, Oriol Batiste.

- Instabilities of the Stewartson Layer II. An Experimental/Numerical Comparison, Tamar More, Birgit Futterer, Rainer Hollerbach, Christoph Egbers.
- From global to local bifurcations in a forced Taylor-Couette flow, V. Iranzo, F. Marques, J. M. Lopez.
- Experimental preparation and design of the geoflow-experiment on ISS, Christoph Egbers, Wolfgang Beyer, Astrid Bonhage, Rainer Hollerbach and Philippe Beltrame.
- Instabilities in asymmetric Taylor Couette flows, Christoph Egbers, Oliver Meincke & Marlene Smiesek.
- Quasi-Periodicity and Chaos in a Differentially Heated Cavity, I. Mercader, O. Batiste, X. Ruiz.
- Initial Fluctuation in Velocity Field and Mode Variation of Taylor-Couette Flow, Furukawa, Kashimoto, Morisue, Nakamura, Toya, Watanabe.
- Numerical simulation of magnetohydrodynamics in a von Karman flow, Piotr Boronski & Laurette Tuckerman.

20:00 Banquet

Saturday, July 5, 2003

Session 3A: Miscellanea. Chair: Yiannis Ventikos.

09:00 A Computational Study of Unsteady Wake of a Bluff Body in Density-Stratified Flow, Sungsu Lee, Kyung-Soo Yang.

09:20 Two-Phase Particulate Flows in U-Bend and Helical Tubes, Prashant Tiwari, Steven P. Antal, Georges Belfort, Andrea Burgoyne, Michael Z. Podowski.

09:40 Nonlinear mechanics of wavy instability of steady longitudinal vortices in free mixing and wall bounded flows, J. T. C. Liu and I. G. Girgis.

10:00 The Asymptotic Structure of Long Wave Görtler Vortices in a Hypersonic Boundary Layer, Vladimir V. Bogolepov.

10:20 Combination interaction of Taylor-Goertler vortices in curved shear layer of supersonic jet, V. Zapryagaev, V. Pickalov, N. Kiselev, A. Nepomnyashchiy.

10:40 Centrifugal Instability in the Backward-Facing Step, Jean-François Beaudoin, Olivier Cadot, Jean-Luc Aider and José Eduardo Wesfreid.

11:00 Coffee Break

Session 3B: Taylor-Couette Flows III. Chair: Gerd Pfister.

11:20 The On set of Taylor-Like Vortex in the Flow Induced by an Impulsively Started Rotating Cylinder, Min Chan Kim and Chang Kyun Choi.

11:40 Very-Low-Frequency State in a Short Annulus Taylor-Couette Flow, Juan M. Lopez, F. Marques.

12:00 3-Dimensional numerical analysis of the Taylor vortex flow with a small aspect ratio (Dynamical condition for the determination of the final mode), Furukawa, Nakamura, Toya, Watanabe.

12:20 Identification of vortex information from flow field in Taylor-Couette system, H. Furukawa, T. Watanabe, I. Nakamura.

12:40 Anomalous dispersion of Couette-Taylor spirals, N.Latrache, A.Ezersky & I. Mutabazi.

13:00 Lunch

Session 3C: Taylor-Couette Flows IV. Chair: Juan M. Lopez.

14:30 **Invited talk:** Taylor-Couette Flow; the long and the short of it, Tom Mullin.

15:20 Transient response at the onset of steady and time-dependent Taylor vortices, J. Abshagen, G. Pfister, A. Cliffe, T. Mullin.

15:40 Complex dynamics in a short Taylor-Couette annulus, F. Marques, J.M. Lopez, J. Shen.

16:00 Coffee Break

Session 3D: Taylor-Couette Flows V. Chair: Richard M. Lueptow.

16:20 Mass Transfer in Rotating Reverse Osmosis Based on Couette-Taylor Flow, Sangho Lee and Richard M. Lueptow.

16:40 Superfluid Couette flow in an enclosed annulus, Karen L. Henderson.

17:00 A Study regarding to the Connections of Electrochemical Properties of Metals and Lubricants Rheology in Cylindric Taylor-Couette Flow, Nicolae-Adrian Palusan, Ioan-Mihai Costea.

17:20 Couette Flow-induced bioluminescence in the dinoflagellate Pyrocystis noctiluca, Anne Sophie Cussatlegras, Patrice Le Gal.

17:40 Quasigasdynamic system of equations and its application to simulation of unsteady viscous flows, Boris N.Chetverushkin, Andrew A.Kuleshov.

18:00 Closing

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Theoretical and Computational Fluid Dynamics

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SPECIAL ISSUE

Taylor–Couette Flows

Edited by
J.M. Lopez · F. Marques · H.J.S. Fernando

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SPECIAL ISSUE

Taylor–Couette Flows

(Continued on the inside cover)

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Theoretical and Computational Fluid Dynamics

Preface

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The geometric simplicity of what has come to be known as Taylor–Couette flow – the flow of a fluid between differentially rotating concentric cylinders – has attracted the interest of scientists since Sir Isaac Newton used it to describe the circular motion of fluids in his *Principia* in 1687. The pioneering theoretical fluid dynamicist George Stokes likewise considered this simple flow in 1845, noting the difficulty in the boundary conditions at the walls of the cylinder, which we now take for granted. His intuition suggested that "eddies would be produced," if the inner cylinder "were made to revolve too fast," a remarkable insight many years before vortices were visualized. The Navier–Stokes equations for viscous fluid flow naturally brought about debate on how to best measure viscosity. Henry Mallock and M. Maurice Couette both sought to accomplish this using apparatuses consisting of two differentially rotating cylinders in the late 1800's, and Couette's name eventually became associated with the flow. But it was not until 1923 that G. I. Taylor was able to relate the theory and experiment for stability in cylindrical Couette flow. His influential investigation was taken by many as convincing proof of the no-slip boundary condition, the Navier-Stokes equations, and linear stability analysis, all fundamental concepts in modern fluid mechanics.

Taylor–Couette and other canonical flows have provided, and continue to provide, new challenges on all fronts in the exploration of the dynamics of fluid flows. This volume presents a small glimpse into recent developments. A unifying theme is nonlinear dynamics. Nonlinear dynamical systems theory provides modern tools for the analysis of infinite dimensional complex systems, such as fluid dynamics, which are complimentary to the more traditional tools of experiments and numerical computations. Together, these tools are being used to further unravel the intricacies of the Navier–Stokes equations.

The papers of this volume were invited on the basis of the presentations at the 13th International Couette–Taylor Workshop: Nonlinear Dynamics in Fluids, held in Barcelona, July 3–5, 2003. The presentations at the meeting were divided into thematic sessions according to their subject area, which are reflected by the papers appearing in this special volume:

- Taylor–Couette Flows

This was the main topic of the conference, and the sessions devoted to it ranged from classical aspects of Taylor–Couette flows (endwall effects, transients, secondary bifurcations) to closely related flows including axial through-flow, axial sliding, azimuthal oscillations, corrugated walls, and porous walls. Studies on more complex/applied flows were also of interest: Superfluid Taylor–Couette flow, electrochemical properties of metals and lubricants, inverse osmosis devices, and applications to biology (induced bioluminescence in dinoflagellates).

- Shear Flows

Transition in Poiseuille and plane Couette flows continue to be a topic of great interest. The basic flow in both problems is linearly stable for all Reynolds numbers, but direct transition to turbulence is often observed in such flows. Hot topics such as subcritical transition to turbulence, spots and turbulent domains are topics of continuing discussion, and several low-dimensional models, as well as computations of unstable states have been developed in recent years.

- Thermal Convection

Rayleigh–Benard convection, as well as related more complex topics, such as convection in binary mixtures, convection in differentially heated cavities, and thermocapillary convection, convection in rotating fluids,

and endwall and aspect ratio effects can be analyzed in the spirit of the Taylor–Couette flow framework, which are reflected in some of the papers.

- Rotating Flows

Analysis of flows confined between disks, and driven by the rotation of one or both disks, can be construed as belonging to the Taylor–Couette family of problems. To this end, presentations dealing with secondary bifurcations and complex heteroclinic dynamics, as well as centrifugal instabilities in supersonic flows, were some of the topics of discussion.

- Magnetohydrodynamics and Dynamo Effect

The dynamo effect, i.e., the presence of a self-sustained magnetic field due to the flow characteristics of a conducting fluid, has received a lot of attention due to potential industrial applications, and its importance in understanding the magnetic properties of stars and planets. A detailed analysis of instabilities in convection between rotating spheres, and their dynamo effect are some recent additions to the list of topics that are akin to Taylor–Couette flows.

- Geophysical and Spherical Taylor–Couette Flows

The flows between concentric spheres have many geophysical applications, mainly in the analysis of planetary atmospheres. Some related issues are the analysis of instabilities of the Stewartson layer, baroclinic instabilities, subcritical instabilities, and unsteady wakes in stratified flows. In the symposium, there was also a communication analyzing a convection experiment in the International Space Station, displaying complex heteroclinic dynamics.

We hope that the rich variety of papers appearing in this volume will be an exposition of the state of the art of research in the realm of Taylor–Couette flows.

Juan M. Lopez
Francisco Marques
Harindra J.S. Fernando

This volume includes a collection of the presented contributions at the 13th Couette-Taylor Workshop, Nonlinear Dynamics in Fluids, held in Barcelona, during July 3 - 5, 2003 hosted by the Department of Applied Physics from the Universitat Politécnica de Catalunya.

Since its first celebration in Leeds (United Kingdom, 1979), the Couette-Taylor Workshop has been gathering scientists from many different areas of physics, applied mathematics and engineering. Initially, this conference was focused on the Taylor-Couette problem, although many other research topics have progressively been included at the meeting during the last two decades. Currently, the Workshop covers not only Taylor-Couette flows, but also other fundamental problems in fluid dynamics such as thermal convection, pattern formation, shear instabilities, etc.

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Nonlinear Dynamics in Fluids

F. Marqués
A. Meseguer (Eds.)

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Proceedings:

14. ICTW

Geophysical Fluid Dynamics

14th International
Couette Taylor Workshop

Hokkaido University, Sapporo, JPN
5.-7. September 2005

Preface

The International Couette Taylor Workshop (ICTW) started in 1979 held in Leeds, UK and took place every two years in Europe and USA. Following the one held in Barcelona, Spain in 2003, the present workshop, 14th ICTW, is held in Sapporo, Japan during 5. to 7. September 2005; the first time outside Western continents and in Asia. We are pleased to have participants of our old colleagues as well as newcomers from Asia and Africa

The workshop is for different fields of science as physics, applied mathematics and engineering, and a platform to exchange information from different points of view on Taylor Couette flow. It focuses obviously on various facets of Taylor Couette flow such as flow instability, numerics, magnetic effect and various geometries, and on more general nonlinear fluid dynamics. As its tradition of having a various related topics as a subtitle, the present workshop is devoted also to geophysical fluid dynamics.

There are 45 contributed papers and 4 plenary lectures in the workshop. Most of the presenters have prepared a full paper which has been published in the on-line journal, "Journal of Physics: Conference Series" of the Institute of Physics. (http://www.iop.org/EJ/toc/1742-6596/14/1)

The Hokkaido University, Graduate School of Engineering is honored to host the present workshop. It has provided financial aids for students and young researchers to participate the workshop. The Japanese Society of Mechanical Engineers and Japan Fluid Mechanics Society support the meeting. We have received a financial support from a company; Asahi Thermal & Fluid System (Nagoya). We express our gratitude to all of these supporters.

Yasushi Takeda
Workshop Organizer
Sapporo, Japan

Schedule

	5-Sep		6-Sep		7-Sep	
8:30	Registration		Plenary Lecture	Dr.Lathrop	Plenary Lecture	Prof.Read
8:50						
9:10	Opening					
9:30	Special Lecture	Prof.Busse				
9:50			(6)TC Mag 1	Le Gal		Youd
10:20	Break			Ito	(11)TC Mag 2	Tagawa
10:40	(1)TC Transition	Czarny		★Kondoh		Kaneda
11:00		Aider	Break		Break	
11:20		Abcha		Henderson		Bogolepov
11:40	Lunch		(7)TC Mixing	Ohmura	(12)Nonlinear	Mellibovsky
12:00				Morita		Mercader
12:20				King		Alonso
12:40	(2)Stability 1	Lipatov	Lunch		Lunch	
1:00		Marques	Plenary Lecture	Dr.Larsen	(13)TC Geometry	Abshagen
1:20		Thomas		Smieszek		Furukawa
1:40	(3)TC General	Deters	(8)TC Non-Newtonian	Latrache		Toya
2:00		Lepiller		Al-Mubaiyedh		Watanabe
2:20		Murai		Hirata		Noui-Mehidi
2:40	Break		(9)Rotating 1	Meseguer	(14)Rotating 2	Furukawa
3:00	(4)Geofluid	Larcher		★Yamaguchi		Sugimoto
3:20		Taniguchi	Break			★Inaba
3:40		Gellert	(10)Stability 2	Heise	Closing	
4:00		Tasaka		Hills		
4:20		★Yoshida	Visit: Nakajima koen			
4:40	(5)TC Temporal	Youd	Dinner : Houheikan			
5:00		★Morinaga				
5:20						
5:40						

Program

5.Sep.2005

Time	
08:30-09:00	Registration
09:00-09:30	Opening
09:30-10:20	Special Lecture Prof.Dr.Busse
10:20-10:40	Coffee Break
10:40-11:40	Session 1 : TC Transition
10:40-11:00	Czarny; Time-scale for transition to Taylor Couette flow
11:00-11:20	Aider; Laminar-turbulent transition in Taylor-Dean open flow
11:20-11:40	Abcha; Characterization of modulated wavy vortex flow and turbulent Taylor vortex flow using PIV in a Couette Taylor system
11:40-12:40	Lunch Time
12:40-14:00	Session 2 : Stability 1
12:40-13:00	Lipatov; Stability of compressible taylor-couette flow. Asymptotical analysis
13:00-13:20	Marques; Global bifurcations of two tori in finite Taylor-Couette flow
13:20-14:00	Thomas; Thermo-mechanical instabilities in Dean and Couette-Taylor flows : mechanisms and scaling laws
14:00-15:00	Session 3 : TC General
14:00-14:20	Deters; The Taylor-Couette system with radial temperature gradient
14:20-14:40	Lepiller; Effects of a radial temperature gradient on the Couette-Taylor flow
14:40-15:00	Murai; Bubble behavior in a vertical Taylor-Couette flow
15:00-15:20	Coffee Break
15:20-17:10	Session 4 : Geofluid
15:20-15:40	Larcher; Dynamics of baroclinic wave pattern in transition zones between different flow regimes
15:40-16:00	Taniguchi; Physical interpretation of unstable modes of a linear shear flow in shallow water on an equatorial beta-plane
16:00-16:20	Gellert; The GeoFlow experiment – spherical Rayleigh-Bénard convection under the influence of an artifical central force field
16:20-16:40	Tasaka; Experimental investigation of natural convection induced by internal heat generation
16:40-16:50	★Yoshida; Ultrasonic measurement of convective motion in liquid gallium layer
16:50-17:20	Session 5 : TC Temporal
16:50-17:10	Youd; Non-reversing modulated Taylor–Couette flows
17:10-17:20	★Morinaga; Oscillating Couette-Taylor flow

★ brief presentation (8 min.)

6.Sep.2005

Time	
08:30-09:20	Plenary Lecture Dr.Lathrop
09:20-10:10	Session 6 : TC Magnetic 1
09:20-09:40	Le Gal; Magnetic field induced by elliptical instability in a rotating ellipsoid
09:40-10:00	Ito; Mode bifurcation control of a magnetic fluid on Taylor-Couette vortex flow with small aspect ratio
10:00-10:10	★Kondoh; Taylor-Couette flow of liquid gallium
10:10-10:30	Coffee Break
10:30-11:30	Session 7 : TC Mixing
10:30-10:50	Henderson; Particle tracking in Taylor–Couette flow
10:50-11:10	Ohmura; Particle classification in Taylor vortex flow
11:10-11:30	Morita; Mixing phenomenon of two immiscible fluids between rotating cylinders
11:30-11:50	King; Effective axial diffusivities for wavy vortex flow from numerical particle tracking: dependence on radius ratio and flow state -
11:50-12:50	Lunch Time
12:50-13:40	Plenary Lecture Dr.Larsen
13:40-13:50	Session 8 : Non-Newtonian
13:40-14:00	Smieszek; Flow structures and stability in Newtonian and non-Newtonian Taylor Couette flow
14:00-14:20	Latrache; Instabilities with shear thinning polymer solutions in the Couette-Taylor system
14:20-14:40	Al-Mubaiyedh; Influence of energetics on the stability of viscoelastic Taylor–Couette flow
14:40-14:50	Session 9 : Rotating 1
14:40-15:00	Hirata; Numerical analysis of binary fluid convection in extended systems
15:00-15:20	Meseguer; On the stability of pressure driven helicoidal flows
15:20-15:30	★Yamaguchi; Behavior of spot like-local structure appearing in torsional Couette flow
15:30-15:50	Coffee Break
15:50-16:30	Session 10: Stability 2
15:50-16:10	Heise; Intermittency in spiral Poiseuille flow
16:10-16:30	Hills; The simultaneous onset and interaction of Taylor and Dean instabilities in a Couette geometry

★ brief presentation (8 min.)

7.Sep.2005

Time	
08:30-09:20	Plenary Lecture Prof.Dr.Read
09:20-10:40	Session 11 : TC Magnetic 2
09:20-09:40	Youd; Hydromagnetic Taylor–Couette flow at very small aspect ratio
09:40-10:00	Tagawa; Numerical analyses of a Couette-Taylor flow in the presence of a magnetic Field
10:00-10:20	Kaneda; Required torque of inner cylinder for electro- conductive Couette-Taylor flow under a magnetic field
10:20-10:40	Coffee Break
10:40-11:40	Session 12 : Nonlinear
10:40-11:00	Bogolepov; The non–stationary perturbations development in a hypersonic boundary layer
11:00-11:20	Mellibovsky; On the minimum amplitude of perturbations triggering transition to turbulence in pipe flow
11:20-11:40	Mercader; Pattern formation in binary mixture convection in three-dimensional cells
11:40-12:00	Alonso; Numerical analysis of binary fluid convection in extended systems
12:00-13:00	Lunch Time
13:00-14:40	Session 13 : TC Geometry
13:00-13:20	Abshagen; Taylor-Couette flow with independently rotating end plates
13:20-13:40	Furukawa; Numerical analysis of non-uniqueness of Taylor vortex flow with small aspect ratio
13:40-14:00	Toya; Numerical analysis of the bifurcation to wavy Taylor vortex flow with a small aspect ratio
14:00-14:20	Watanabe; Development of free surface flow between concentric cylinders with vertical axes
14:20-14:40	Noui-Mehidi; A numerical study of Taylor vortex flow in a finite length tapered annulus
14:40-15:50	Session 14 : Rotating 2
14:40-15:00	Furukawa; Visual study of variation of flow patterns around a disc in a casing: effect of edge of the disc
15:00-15:20	Sugimoto; Gravity wave radiation from unsteady rotational flows in F-plane shallow water system
15:20-15:30	★Inaba; Analysis of a vortex ring in rorating field using multi-dimensional UVP
15:30-16:30	Closing

★ brief presentation (8 min.)

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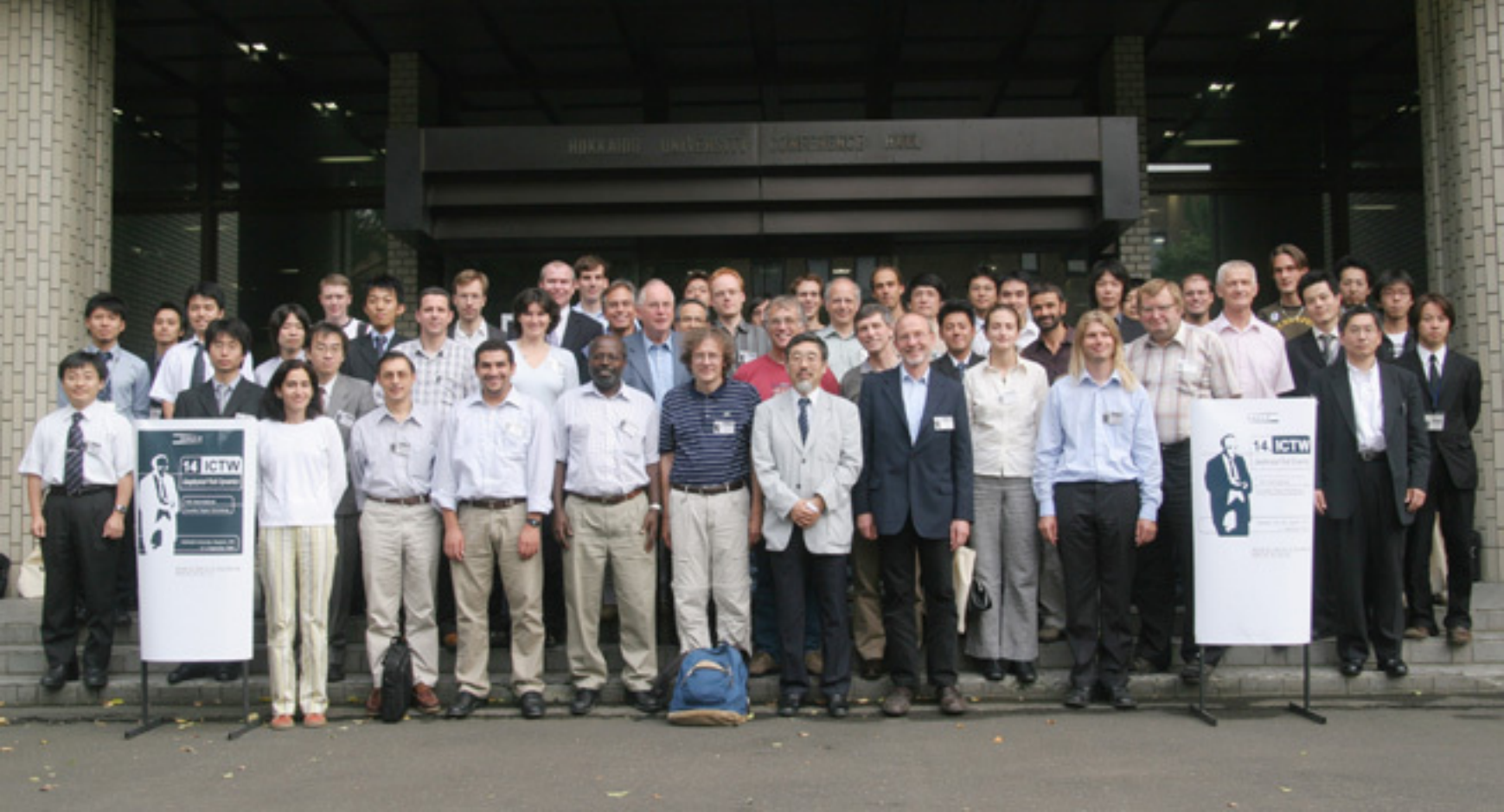
Volume 14, 2005

14TH INTERNATIONAL COUETTE TAYLOR WORKSHOP
5–7 September 2005, Sapporo, Japan

14. ICTW **Revised Program with Chairperson**

5 Sep.				6 Sep.				7 Sep.			
8:30	Registration			8:30	Lecture2	Lathrop (Pfister)		8:30	Lecture4	Read (Leuptow)	
8:50				8:50				8:50			
9:10	Opening			9:20	12	TC Mag 1(Watanabe)		9:20	48	TC Mag 2 (Tagawa)	
9:30	Lecture1	Busse (Read)		9:40	18			9:40	24		
9:50				10:00	55			10:00	19		
10:20	Break			10:10	Break			10:20	Break		
10:40	52	TC-Transition (Marques)		10:30	47	TC Mixing (Leuptow)		10:40	34	Nonlinear (Pfister)	
11:00	1			10:50	22			11:00	43		
11:20	10			11:10	29			11:20	44		
11:40	Lunch Time			11:30	9	TC Non-Newtonian (Barengi)		11:40	40		
12:00				11:50	11			12:00	Lunch Time		
12:20				12:10	54			12:20			
12:40	35	Stability 1 (Le Gal)		12:30	Lunch Time			12:40			
1:00	42			12:50				1:00	3	TC Geometry (Le Gal)	
1:20	50			1:10				1:20	15		
1:40	5	TC various (Mutabazi)		1:30	Lecture3	Larsen (Lathrop)		1:40	28		
2:00	13			1:50				2:00	30		
2:20	21			2:20	14	Rotating 1 (Hills)		2:20	2		
2:40	Break			2:40	45			2:40	16	Rotating 2 (Meseguer)	
3:00	8	Geofluid (King)		3:00	31			3:00	23		
3:20	26			3:10	Break			3:20	17		
3:40	6			3:30	7	Stability 2 (Gellert)		3:40	Closing		
4:00	27			3:50	46			4:00			
4:20	51			4:10				4:10			
4:40	49	TC Temporal (Ohmura)		4:30	Visit : Nakajima Park			4:30			
5:00	20			4:50				4:40			
5:20				6:30	Dinner : Houheikan			5:20			
5:30								5:40			


14 ICTW
14 ICTW

15th International Couette-Taylor Workshop

9-12 July 2007
Le Havre University
Le Havre, France

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Proceedings of the

15^{th} International Couette–Taylor Workshop

July 9-12, 2007

Le Havre University

Le Havre, France

Workshop Chairman: Pr. Innocent Mutabazi

Workshop Secretary: Dr. Olivier Crumeyrolle

Foreword

Le Havre University is honored to host the 15thInternational Couette-Taylor Worskhop (ICTW15) from 9th to 12th July 2007 in Le Havre. The International Couette-Taylor Workshop started in1979 when the research interest in simple models of fluid flows was revitalized by the investigation of the Rayleigh-Bénard convection whose the Couette-Taylor represents the hydrodynamic twin. The first workshop was organized in Leeds (UK) where 21 participants presented 18 communications. Since then, it has been organized each two years alternatively in Europe and in USA, the 14th workshop was held in Sapporo, Japan. The number of participants has grown to 70-100 participants from typically 10 to 15 countries with an average of 60 contributed papers. The Table gives the story of the Workshop:

Year	Location	Organizers
1979	Leeds, UK	J.E.R. Coney
1981	Medford, MA, USA	Ken Astill
1983	Nancy, France	Gérard Cognet
1985	Karlsruhe, Germany	Karl Bühler, Manfred Wimmer, J. Zierep
1987	Tempe, AZ, USA	Dan Jankowski, Paul Nietzel
1989	Brussels, Belgium	Daniel Walgraef
1991	Columbus, OH, USA	C. David Andereck, Fernand Hayot
1993	Nice, France	Patrice Laure, Gérard Iooss
1995	Boulder, CO, USA	Randall Tagg, Patrick Weidman
1997	Paris, France	Christiane Normand, J.Eduardo Wefreid
1999	Bremen, Germany	Christoph Egbers, Hans Rath
2001	Evanston, IL, USA	Richard M. Lueptow
2003	Barcelona, Spain	Francisco Marques
2005	Sapporo, Japan	Yasushi Takeda
2007	Le Havre, France	Innocent Mutabazi

The workshop themes have been expanded from the original Couette-Taylor flow to include other centrifugal instabilities (Dean, Görtler, Taylor-Dean), spherical Couette flows, thermal convection instabilities, MHD, nonlinear dynamics and chaos, transition to turbulence, development of numerical and experimental techniques. The impressive longevity of the ICTW is due to the close interaction and fertile exchanges between international research groups from different disciplines: Physics and Astrophysics, Applied Mathematics, Mechanical Engineering, Chemical Engineering.

The present workshop is attended by 100 participants, the program includes over 80 papers with 4 plenary lectures, 68 oral communications and 17 posters. The topics include, besides the classical Couette-Taylor flows, the centrifugal flows with longitudinal vortices, the shear flows, the thermal convection in curved geometries, the spherical Couette-Taylor flow, the geophysical flows, the magneto-hydrodynamic effects including the dynamo effect, the complex flows (viscoelasticity, immiscible fluids, bubbles and migration). The authors have the possibility of submitting a full paper in the "Journal of Physics: Conference Series" of the Institute of Physics.

The Workshop has been sponsored by Le Havre University (the Scientific Council, the College of Science and Technology, the College of Logistics and the Graduate School of

Physics, Mathematics and Information for Engineers), the Region Council of Haute-Normandie, Le Havre City Council, CNRS (Department of Applied Sciences and Information Technology, Research Group DYCOEC: Dynamics and Control of Complex Systems), the European Space Agency through GEOFLOW program. The Ministry of Defense (DGA), the Ministry of Foreign Affairs, the Ministry of Research and the University Association of Mechanics have provided some support. Over 30 young researchers and research from emerging countries have been supported by partial waiving of conference fee and hotel fee thanks to these grants.

Innocent Mutabazi
Workshop Chairman
Le Havre, France
July 9, 2007

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- Kyung-Soo YANG, Inha University, Incheon, South Korea

Contents

Journal of Physics: Conference Series **137** (2008) 011001 doi:10.1088/1742-6596/137/1/011001

Preface

The 15th International Couette-Taylor Worskhop (ICTW15) was held in Le Havre, France from 9th to 12th July 2007. This regular international conference started in1979 in Leeds, UK when the research interest in simple models of fluid flows was revitalized by systematic investigation of Rayleigh-Bénard convection and the Couette-Taylor flow. These two flow systems are good prototypes for the study of the transition to chaos and turbulence in closed flows.

The workshop themes have been expanded from the original Couette-Taylor flow to include other centrifugal instabilities (Dean, Görtler, Taylor-Dean), spherical Couette flows, thermal convection instabilities, MHD, nonlinear dynamics and chaos, transition to turbulence, development of numerical and experimental techniques. The impressive longevity of the ICTW is due to the close interaction and fertile exchanges between international research groups from different disciplines: Physics and Astrophysics, Applied Mathematics, Mechanical Engineering, Chemical Engineering.

The present workshop was attended by 100 participants, the program included over 83 contributions with 4 plenary lectures, 68 oral communications and 17 posters. The topics includes, besides the classical Couette-Taylor flows, the centrifugal flows with longitudinal vortices, the shear flows, the thermal convection in curved geometries, the spherical Couette-Taylor flow, the geophysical flows, the magneto-hydrodynamic effects including the dynamo effect, the complex flows (viscoelasticity, immiscible fluids, bubbles and migration).

Selected papers have been processed through the peer review system and are published in this issue of the "Journal of Physics: Conference Series".

The Workshop has been sponsored by Le Havre University, the Region Council of Haute-Normandie, Le Havre City Council, CNRS (ST2I, GdR-DYCOEC), and the European Space Agency through GEOFLOW program. The French Ministry of Defense (DGA), the Ministry of Foreign Affairs, the Ministry of Research and the University Association of Mechanics have provided some support.

Innocent Mutabazi

Olivier Crumeyrolle

Proceedings editors

Le Havre, France
July 15, 2008

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ICTW:

16th International Couette-Taylor Workshop

September 9 - 11, 2009, Princeton University

Scientific Program

All Workshop presentations are in the Friend Center Convocation Room
Invited talks have 45 minutes and contributed talks have 15 minutes.

Wednesday, September 9

8:00 am

Registration and Breakfast - Friend Center Convocation Room

8:55 am – Welcome and Announcements

9:00 am – Turbulence (Chair: A. Smits)

Keynote Speaker: **Juan M. Lopez,** School of Mathematical & Statistical Sciences, Arizona State University, Tempe AZ, USA
Complex spatio-temporal dynamics in short-aspect-ratio Taylor-Couette Flow

9:45 **F. Marques, A. Meseguer, F. Mellibovsky, M. Avila** Spiral turbulence in counter-rotating Taylor–Couette flow

10:00 **S. Dong** Direct Numerical Simulation of Spiral Turbulence

10:15 am

Break – Friend Center

10:40 am – MHD (1) (Chair: G. Rüdiger)

Stirling Colgate, Jaihe Si Ekman Layer Turbulence and the alpha-omega Dynamo Experiment

10:55 **Daniel P. Lathrop, Daniel S. Zimmerman, Santiago A. Triana, Matthew Adams, Douglas H. Kelley, Andreas Tilgner, Matthew S. Paoletti** Turbulent dynamics in rapidly rotating Couette flows. magnetorotational instabilities on top of turbulent flow.

11:10 **L. Garcia de Andrade** Geodesic lows on compact Riemannian manifolds of constant negative curvature: Cosmological Implications

11:25 **Cary Forest, Cami Collins, Jon Jara-Alamonte, Roch Kendrick** Laboratory Studies of the Magnetorotational Instability in a Plasma ✓

11:40 **I. Khalzov, F. Ebrahimi, C. Forest, D.D. Schnack** Numerical Study of Von Karman Flow in Madison Plasma Couette Experiment

11:55 **Cami Collins, Hantao Ji,** Characterizing Plasma Rotation in the Helicon MRI Experiment

12:10 pm
Lunch - Friend Center Atrium

1:30 pm – MHD (2) (Chair: H. Ji)

Günther Rüdiger MHD Taylor-Couette experiments with nonaxisymmetric magnetic instabilities

1:45 **Thomas Gundrum, Gunter Gerbeth, Frank Stefani, Rainer Hollerbach, Janis Priede, Günther Rüdiger, Jacek Szklarski** Experiments on the helical magnetorotational instability in a Taylor-Couette flow with reduced Ekman pumping

2:00 **J. Goodman, W. Liu** Helical Magnetorotational Instability: Local and global dynamics

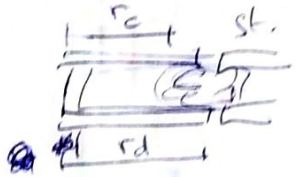
2:15 **Isom Herron, Jeremy Goodman** Gauging MRI for all magnetic Prandtl numbers

2:30 **M. Nornberg, H. Ji, E. Schartman, A. Roach** Observation of magnetocoriolis waves in a liquid metal Taylor-Couette experiment

2:45 **A. Obabko, F. Cattaneo, P. Fischer** Numerical Simulations of Magnetized Couette Flow in Cylindrical Annulus

3:00 **Ben Jamroz, Keith Julien, Edgar Knobloch** Magnetorotational Instability: Recent Results

3:15 **Fatima Ebraham, Dalton Schnack, Cary Forest** Magnetorotational Instability and dynamo process



3:30 pm
Break – Friend Center

4:00 pm – Rotating Disks (Chair: I. Mutabazi)

Hiroyuki Furukawa, Masayuki Nakajima, Takuma Ohashi, Takashi Watanabe Experimental study of the effect of circular walls on flows around a rotating disk in a cylindrical casing

4:15 **Yuji Tasaka, Makoto Iima, Yuzuru Sato** Statistics and dynamical analysis of surface switching in rotating fluid

4:30 **P.D. Weidman** Float height and quasi-steady spin-down of a rotating disk

4:45 **Takashi Watanabe, Hiroyuki Furukawa** Evaluation of Flow Structure around a Finite-thickness Rotating Disk in a Cylindrical Enclosure

5:00 **K. Hirata, A Sakamoto, A. Kitagawa, J. Funaki** Experiment on the flow mode based on central-core-boundary configuration between co-rotating disks

5:15 **Vaclav Sobolik, Magdalena Kristiawan, Tomas Jirout** Multiplicity of wavy-vortex flow with one travelling wave Canceled.

6:00 – 7:30 pm
Cocktail Reception: Chancellor Green Rotunda
Dinner on your own

Thursday, September 10

8:00am
Registration and Breakfast – Friend Center Convocation Room

8:30 am – Couette-Taylor Flow (Chair: R. Tagg)

Keynote Speaker: **Russell J. Donnelly**, Department of Physics, University of Oregon
Fifty Five Years of Couette-Taylor Flow: a Perspective

9:15 **Michael A. Sprague, P.D. Weidman** Continuously Tailored Taylor Vortices

9:30 **Rafael J. Pacheco, Juan Lopez, Francisco Marques** Pinning of rotating waves to defects in finite Taylor Couette Flow

9:45 **Dennis P.M. van Gils, Sander G. Huisman, Chao Sun, Detlef Lohse** Twente Turbulent Taylor-Couette (T3C)

10:00 **Michael Belisle, W.S. Saric, M. Avila, J.M. Lopez, F. Marques** Mode competition in experimental modulated Taylor Couette flow

10:15 am
Break – Friend Center

10:40 am – Temperature and Density Gradients (Chair: C. Egbers)

10:40 **Raphael Guillerm, A. Prigent, Innocent Mutabazi** Temperature and velocity measurements in a Couette-Taylor system with a radial temperature gradient

10:55 **Dong-Hyeog Yoon, Chang-Woo Kang, Kyung-Soo Yang, Innocent Mutabazi** Effect of radial temperature gradient on Taylor vortex flow

11:10 **Marlene Smieszek, Olivier Crumeyrolle, Innocent Mutabazi, Christoph Egbers** Instability induced by dielectrophoretic effect in a dielectricc liquid inside a cylindrical annulus submitted to a radial alternative electric field and a radial temperature gradient

11:25 **Bruce Rodenborn, Ahbay Argarwal, Harry L. Swinney** Laboratory Observation of Stratorotational Instability with a Large Density Gradient

11:40 **Juan Lopez, Antonio Rubio, Francisco Marques** Rotating convection: transitions from wall modes to quasi-geostrophic turbulence

Marcus Gellert, Günther Rüdiger Taylor-Couette flows heated from above

12:10 pm
Lunch – Friend Center Atrium

1:30 pm – Instabilities (Chair: L. Tuckerman)

Daniel Borrero-Echeverry, Michael F. Schatz Transient Turbulence in Taylor-Couette Flow

Marc Avila, M. Grimes, Juan Lopez, B. Hof Transient growth effects in quasi-Keplerian Taylor–Couette flows

Michael J. Burin Characterizing the Subcritical Transition to Turbulence in Taylor-Couette Flow

K. Hochstrate, J. Abshagen, M. Avila, M. Heise, G. Pfister Hydrodynamic instability in Rayleigh stable Taylor-Couette flow

Denis Martinand, Eric Serre, Richard M. Lueptow Absolute and convective instability of Couette-Taylor flow with axial and radial flows

I.I. Lipatov, M.I Lipatov Some problems of flow instability in compressible flows

3:00 pm
Break – Friend Center

3:30 pm – Taylor-Couette and Related Flows (Chair: J. Lopez)

Randall Tagg, Brad Busley, Aaron Ferona, Eusebio Torres, Andy Somogyi, Chase Latta Unfinished Business in Spiral Vortex Flow Between Counter-Rotating Cylinders

Matti Heise, Ch. Hoffmann, J. Abshagen, A. Pinter, G. Pfister, M. Lücke Stabilization of Domain Walls between Traveling Waves by Nonlinear Mode Coupling in Taylor-Couette Flow

Yasser Aboelkassem, Anne E. Staples Taylor-Couette flow with a modified inner cylinder

Peter Stücke, Marcus Schmidt, Matthias Nobis Couette Flow in small channels with cross flow

David Fabre, Edgar Knobloch Mode interaction in the wake of axisymmetric objects: a relative to the Couette-Taylor problem

J.E. Wesfreid, M. Chrust, L. Tuckerman, A. Przadka, S. Goujon-Durand, A. Noga, K. Gumowski Flow instabilities in the wake of the sphere

Girija Jayaraman, Sushil Kumar Taylor Dispersion in Curved Channels

Stepan Papacek, Karel Petera, Ctirad Matonoha, Vaclav Stumbauer, Salibor Stys Couette-Taylor photo-bioreactor: Growth impact of radial dispersion and shear stress

6:00 pm

Cocktails and Dinner Banquet - Prospect House: Drawing Room

Friday, September 11

8:00 am

Registration and Breakfast – Friend Center

8:30 am - Faraday Waves and Related Flows (Chair: Y. Takeda)

Keynote Speaker: Laurette Tuckerman Physique et Mecanique des Milieux Heterogenes, Ecole Superieure de Physique et de Chimie Industrielles de la Ville de Paris, France
Numerical Simulation of Faraday Waves (with co-authors Nicolas Perinet and Damir Juric)

J. Funaki, T. Shimonishi, K. Hirata An experimental study on Faraday-wave patterns in shallow containers

Hirochika Tanigawa, Masanao Gomon, Tohru Nakashima, Jiro Funaki, K. Hirata Faraday-wave Patterns in an Equilateral-Polygonal-Section Cylindrical Container

B.L. Smorodin, M. Lücke Binary fluid mixture convection with modulated heating

Antonio Rubio, Juan M. Lopez, Francisco Marques Onset of Küppers-Lortz like dynamics in finite rotating convection

10:15 am

Break – Friend Center

10:40 am - Spherical Couette (Chair: D. Lathrop)

Xing Wei, Rainer Hollerbach MHD spherical Couette flow in linear combinations of axial and dipolar magnetic fields

Erik Spence Simulations of spherical Couette flow in a dipolar magnetic field

N. Scurtu, C. Egbers Co-existence of pulsating and traveling waves in natural convective air flow in spherical shells

F. Mokhtari, A Bouabdallai, M. Zizi, S. Hanchi Three-dimensional study on spherical Czochralski process growth with crystal rotation

Birgit Futterer, S. Koch, N. Dahley, Christoph Egbers Convection patterns in rotating spherical shells from `GeoFlow', the geophysical flow simulation experiment integrated in Fluid Science Laboratory

Karl Buehler Flow Pattern induced by interacting rotating spheres

12:10 pm
Lunch – Friend Center Atrium

1:30 pm – Transition (Chair: F. Marques)

Yasushi Takeda, Koji Yoshida, Yuichi Murai, Yuji Tasaka Periodic transition between spiral and toroidal modes in a Taylor-Couette bubbly flow

S. Altmeyer, Ch. Hoffmann, M. Lücke Transitions between Taylor vortices and spirals via wavy Taylor vortices and wavy spirals

Irina Morshneva, S.N. Ovchinnikova Resonances in the codimension-2 bifurcations in the Couette-Taylor problem

F. Feudel, P. Beltrame, K. Bergemann, L.S. Tuckerman Symmetry-breaking bifurcations in centrally forced convection of the GEOFLOW experiment

A.A. Alexeev, I.V. Morshneva The intersection of bifurcations of Taylor vortices and azimuthal waves in the Couette-Taylor problem

A. Youd, C. Barenghi Bifurcation control of Taylor–Couette flow using an applied magnetic field

3:00 pm
Break – Friend Center

3:30 pm – Non-Newtonian Flows (Chair: R. Lueptov)

Marlene Smieszek, Christoph Egbers Pattern formation of a viscoelastic polyacrylamide solution in the Taylor Couette system

Noureddine Latrache, Innocent Mutabazi Spatiotemporal dynamic of wall mode in viscoelastic Couette-Taylor flow

Fayçal Kelai, Olivier Crumeyrolle, Innocent Mutabazi Purely elastic instability of polymer solutions without shearthinning effect in the Couette-Taylor system

Bashar Albaalbaki, Roger E. Khayat Non-Newtonian effects on roll pattern in Rayleigh-Bénard convection

4:30 pm – Final Discussions (H. Ji and A. Smits)

6:00pm - Dinner
On your own

Posters (Wednesday – Friday)

M. Adnane, A. Bouabdallah Linear Theory of Taylor Vortex Flow in the Inclined Taylor-Couette Flow System

A.A. Castrejón-Pita, P. L. Read Synchronization of modulated travelling baroclinic waves in a rotating fluid annulus

Christoph Egbers Transition to turbulence in Taylor-Couette flows for co- and counter-rotating cylinders

U. Harlander, R. Faulwetter, K. Alexandrov, C. Egbers Estimating local instabilities for irregular flows in the differentially heated rotating annulus

Ch. Hoffmann, M. Heise, S. Altmeyer, J. Abshagen, A. Pinter, M. Lücke, G. Pfister Stable nonlinear defects separating localized spiral domains

M. Paoletti, D. Lathrop Turbulent Taylor-Couette flow between independently rotating cylinders

A. Pinter, M. Lücke, Ch. Hoffmann Wave-number dependence of the transitions between traveling and their mixed states in the Taylor-Couette system

A. Roach, M. Nornberg. H. Ji, E. Spence Internal velocity measurements in the Princeton MRI experiment

J. Rolland, P. Manneville Oblique turbulent bands in plane Couette flow: From visual to quantitative data

N. Scurtu, A. Christl, P. Gorenz, C. Egbers Eccentrical Taylor-Couette flow with moving inner cylinder and superimposed cross flow

Yuji Tasaka, Yuichi Murai, Tomoaki Watamura, Yasushi Takeda Taylor-Couette flow with microbubbles

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ICTW:
16th Couette-Taylor Workshop
September 9 - 11, 2009 Princeton, NJ

17th International Couette-Taylor Workshop

University of Leeds

Monday 25 - Wednesday 27 July, 2011

Organiser: Dr. Rainer Hollerbach (rh_at_maths.leeds.ac.uk)
http://www.maths.leeds.ac.uk/~rh/

Registration and Accommodation Programme Links Participants

Invited Speakers

Professor Dwight Barkley (Warwick)
Professor Juan Lopez (Arizona State)
Professor Chao Sun (Twente)

Registration and Accommodation

Accommodation (fully en-suite at £45/night, or semi en-suite at £35/night) has been reserved at Storm Jameson Court, which is at the heart of the university campus.

The early registration fee (valid until April 15th) for the meeting is: £200 (£120 for Research Students). This will include lunch on all three days, plus coffee/tea breaks. The conference dinner on Tuesday evening is £40.

Registration is available with instant confirmation via the University of Leeds secure online conference booking and payment system. You can also book accommodation via this system. Payment must be made by credit or debit card. You will be required to create a new customer account. Please click here.

If you require alternative means of payment, please note a surcharge may apply. Contact Paul on ICTW2011@leeds.ac.uk for more information.

Workshop Venue

The Workshop will be held at the University of Leeds, Yorkshire Bank Lecture Theatre (Business School).
The conference dinner will take place in the Great Woodhouse Suite, University House, at the University of Leeds on Tuesday 26 July.

Click here for directions to the University of Leeds.
Directions to the School of Mathematics.
Campus map (84 = Maths / Earth and Environment Building, 19 = Business School, 28 = University House, 86 = Storm Jameson Court).

Conference Photo

Programme

17th International Couette-Taylor Workshop

University of Leeds, July 25-27 2011

Monday July 25

8:30 – 9:15 Welcome and Registration

S Altmeyer, C Hoffmann
Secondary bifurcation of mixed cross-spirals connecting different travelling wave solutions

R Lueptow, E Serre, D Martinand
The transition to wavy vortices

H Furukawa, M Ohno, N Ohazama, N Suzuki, T Watanabe
Analysis of Taylor vortex flow with small aspect ratio by particle image velocimetry (PIV) method

Y Tasaka, M Iima
Global flow transition induced by local disturbances generated by rotor-cylinder gap in rotating fluids with free surface

C Guervilly, P Cardin, N Schaeffer
A dynamo driven by zonal jets at the upper surface: applications to giant planets

10:30 – 11:00 Coffee Break

D Brito, T Alboussière, P Cardin, N Gagnière, D Jault, P La Rizza, J-P Masson, H-C Nataf, D Schmitt
Zonal shear and super-rotation in a magnetized spherical Couette flow experiment

C Gissinger, A Roach, E Edlund, E Spence, H Ji, J Goodman
Magnetorotational instability (MRI) in laboratory experiments

M Seilmayer, G Gerbeth, T Gundrum, F Stefani, T Weier, M Gellert, G Rüdiger
A liquid metal experiment on the Tayler instability

M Gellert, G Rüdiger, M Schultz, F Stefani, M Seilmayer
Tayler instability influenced by internal heating

O Kirillov, F Stefani
Paradox of Velikhov-Chandrasekhar and the ultimate limit for the onset of helical magnetorotational instability

12:30 – 2:00 Lunch

R Hollerbach, X Wei, A Jackson
Electromagnetically driven flows in a rapidly rotating spherical shell

T Watanabe
Bead-like vortex and sickle-like vortex found around a thick rotating disk in a casing

A Christl, N Scurtu, C Egbers
Eccentric Taylor-Couette flow with orbital motion of the inner cylinder

P Stücke, M Schmidt, M Nobis
Three-dimensional computation of the Couette flow in journal bearings

T Seelig, U Harlander, R Faulwetter, C Egbers
Irregular and singular vector growth in the differentially heated rotating annulus

3:30 – 4:00 Coffee Break

D Barkley (Invited Talk, 45 minutes)
Simplifying the complexity of pipe flow

G Pfister, M Heise, C Will, O Staack, J Abshagen
A stationary-turbulent transition in enclosed Taylor-Couette flow

M Burin
Gap-width and end-cap effects on the sub-critical transition to turbulence

5:30 – 6:30 Drinks Reception

Tuesday July 26

9:00 – 9:15 Registration Desk Open

M Gassa Feugaing, O Crumeyrolle, I Mutabazi
Modulated Couette-Taylor flow

C Panades, F Marques
Bifurcations to three-dimensional flows in a periodically driven cylindrical cavity

T Watanabe
Time constant in the onset and decay flow of Taylor-Couette flow around critical Reynolds number

R Khayat, B Albaalbaki
Non-Newtonian induced thermal convection patterns

10:30 – 11:00 Coffee Break

N Latrache, I Mutabazi, O Crumeyrolle
Transition to inertioelastic turbulence via spatio-temporal intermittency in a viscoelastic Couette-Taylor flow

N Scurtu, P Gorenz, C Egbers
Magnetorotational-type instability in Couette-Taylor flows of viscoelastic polymeric liquids

B Alibenyahia, C Lemaitre, C Nouar
Taylor-Couette flow of viscoplastic fluids

S Papacek, V Stumbauer, D Stys, K Petera
Couette-Taylor photo-bioreactor: A perfect tool to explore both the impact of hydrodynamic mixing and shear stress on microalgae cells

V Stumbauer, S Papacek, V Kotal, D Stys, K Petera
Couette-Taylor photo-bioreactor: A perfect tool to explore the microalgae cell damage by shear stress

12:30 – 2:00 Lunch

C Sun, D van Gils, S Huisman, G-W Bruggert, D Lohse (Invited Talk, 45 minutes)
Torque scaling in turbulent Taylor-Couette flow with co- and counter-rotating cylinders

S Tokgoz, G Elsinga, R Delfos, J Westerweel
An experimental study on the influence of the coherent structures to the torque scaling in turbulent Taylor-Couette flow

M Paoletti, D Lathrop
Turbulent angular momentum transport measurements in rapidly rotating Taylor-Couette flow up to $Re = 4.4 \cdot 10^6$

S Merbold, C Egbers
Turbulent Couette-Taylor flow - An experimental investigation of the angular momentum flux

3:30 – 4:00 Coffee Break

H Brauckmann, B Eckhardt
Torque calculations for Taylor-Couette flow

F Marques, J Lopez
Boundary layer instabilities in rapidly rotating flows

S Huisman, D van Gils, C Sun, D Lohse
Turbulent statistics in Taylor-Couette flow

D van Gils, D Guzman, C Sun, D Lohse
Drag reduction, bubble distribution and velocity profiles in bubbly turbulent Taylor-Couette flow (Awarded best student presentation prize)

6:30 – 10:00 Dinner

Wednesday July 27

9:00 – 9:15 Registration Desk Open

D Zhilenko, O Krivonosova
Various turbulent states in wide gap spherical layer

D Zhilenko, O Krivonosova
Secondary flow state selection in wide gap spherical layer under inner sphere acceleration action: experiment and DNS

S Koch, U Harlander, R Hollerbach, C Egbers
Laboratory experiment and numerical simulations of inertial wave interactions in a rotating spherical shell

K Bühler
Numerical simulations of spherical gap flows with superimposed mass flux

10:30 – 11:00 Coffee Break

J Lopez (Invited Talk, 45 minutes)
Rotating thermal convection

B Futterer, F Zaussinger, S Koch, A Krebs, C Egbers
Nonlinear effects and associated instabilities in iso-viscous and temperature-dependent viscous thermal convection in spherical shells

F Feudel, L Tuckerman, C Egbers
Convection patterns in a central forced spherical fluid shell under microgravity conditions

O Crumeyrolle, M Smieszek, I Mutabazi, C Egbers
Dielectrophoretic instabilities in annular configurations

12:30 – 2:00 Lunch

K Hirata, N Nakamura, H Tanigawa
On the effect of forced-oscillation amplitude upon thermal convection in a cube

R Bellatreche, M Ouali, A Bouabdallah
Assessment of entropy variation in Taylor-Couette flow

T von Larcher, A Fournier, R Hollerbach
The influence of bottom topography on the linear stability of baroclinic waves in the thermally driven rotating annulus

M Nagata, K Deguchi
Mirror symmetric travelling wave solution in plane Poiseuille flow

3:00 – 3:30 Coffee and Farewell

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Conference picture labels

	RED		GREEN
a	Richard Lueptow	a	Sandy Koch
b		b	Christoph Egbers
c	Olivier Crumeyrolle	c	Gerd Pfister
d		d	
e	Mireille Tadie	e	Sebastian Altmeyer
f	Karl Buehler	f	
g	Cecile Lemaitre	g	Takashi Watanabe
h	Paul Neitzel	h	
i	Christophe Gissinger	i	Francisco Marques
j	Carles Panades	j	Olga Krivonosova
k		k	Dmitry Zhilenko
l	Rainer Hollerbach	l	Thomas von Larcher
m		m	
n	Daniel Lathrop	n	
o	Dwight Barkley	o	Fred Feudel
p	Chris Jones	p	Juan Lopez
q		q	Chao Sun
r	Marcus Gellert	r	Jose M. Lopez
s	Roger Khayat	s	Michael Burin
t		t	Masato Nagata
u	Ashley Willis	u	
v		v	Satish Malik
w	Matti Heise	w	Innocent Mutabazi
x	Hannes Brauckmann	x	
y	Philippe Cardin		
z	Nicoleta Herzog		

18th International Couette-Taylor Workshop

University of Twente
Enschede, The Netherlands

Keynote speakers

Fausto Cattaneo *(University of Chicago)*
Patrice Le Gal *(Université Aix-Marseille I)*
Richard M. Lueptow *(Northwestern University)*

24 – 26 june 2013

Local organizing committee

Chao Sun
Detlef Lohse
Sander Huisman

Contact

ictw18@gmail.com
http://pof.tnw.utwente.nl/ictw

Physics of fluids group

1 Welcome

Dear Attendee,

We would like to welcome you to the 18th International Couette–Taylor Workshop (ICTW18) at the University of Twente, The Netherlands. We hope you will enjoy the talks and discussions at our workshop as well as our campus. We have a jam-packed schedule waiting for you, with many keynote speeches, talks, a poster session, a lab-tour through our facilities, and plenty of time to discuss with your peers. We hope you will enjoy the three days at our University and leave with many new research ideas.

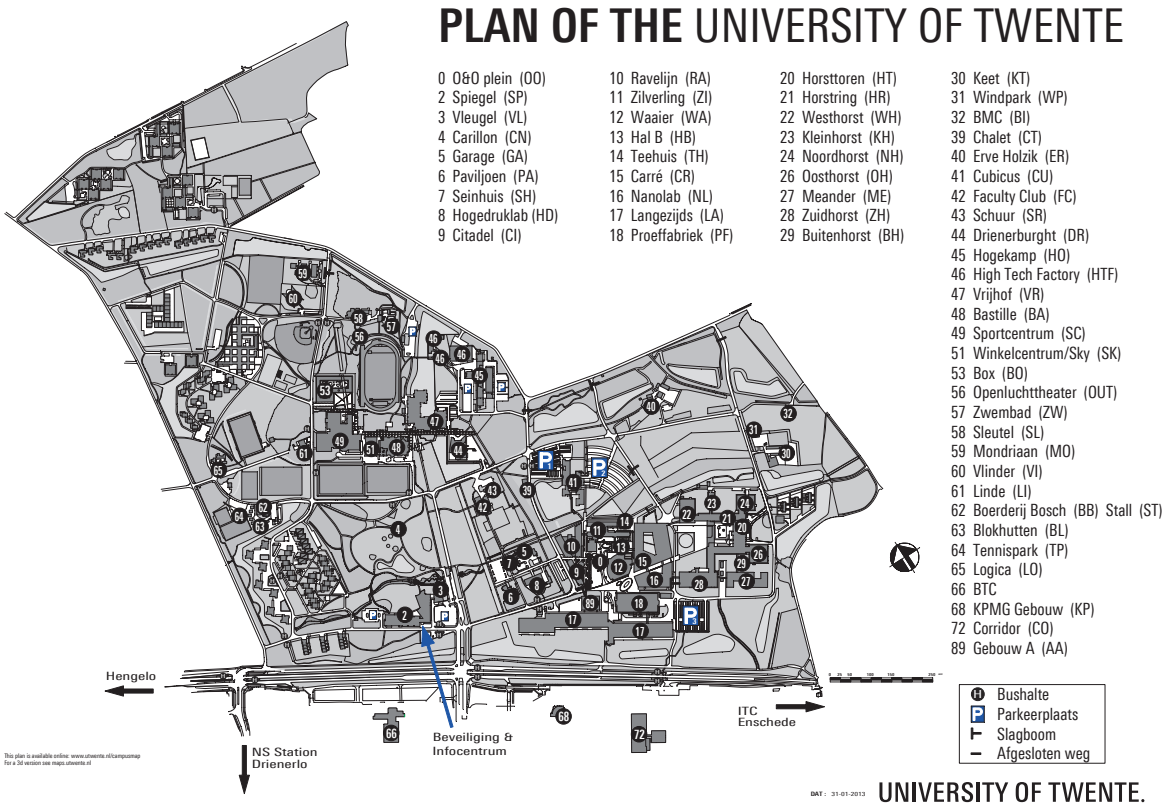
With kind regards,

The organisation committee

Chao Sun
Detlef Lohse
Sander G. Huisman
University of Twente
Enschede, The Netherlands

2 Venue

The workshop will be held in the Horst building. The conference will be held in room **C101**; which is located at the ground floor, at the base of the **Horsttoren (HT)** numbered **20** in the map below. The conference dinner will be held at the **Faculty club (FC)** numbered **42** below.



4 Schedule

Sunday 23 June 2013

16:00-18:00	Registration	**Drienerburght (DR)** building **44**

Monday 24 June 2013

08:00-08:25	Registration	**Horsttoren (HT)** building **20** room **C101**
08:25-08:30	Welcome	**Horsttoren (HT)** building **20** room **C101**
08:30-09:30	Session 1	**Talk 1:** Viscoelastic Instability in the Taylor-Couette System and Magnetorotational Instability Analogy ***Nicoleta Herzog***, *Christoph Egbers, Olivier Crumeyrolle, Innocent Mutabazi* **Talk 2:** Minimal disturbances that trigger turbulence in subcritical shear flow ***Ashley P. Willis***, *Chris C. T. Pringle, Rich R. Kerswell* **Talk 3:** Mechanisms for secondary instabilities in Couette-Taylor flow with superimposed axial and radial throughflows ***Denis Martinand***, *Richard M. Lueptow* **Talk 4:** Inertial waves in a rotating spherical shell and annulus induced by wall libration ***Uwe Harlander***, *Ion D. Borcia, Christoph Egbers, Abouzar Ghasemi V., Marten Klein, Sandy Koch, Eberhardt Schaller, Torsten Seelig, Andreas Will, Michael Kurgansky,, Rainer Hollerbach*
09:30-10:00	Break	
10:00-11:15	Session 2	**Talk 5:** A gravity wave bifurcation in a Taylor-Couette system with free surface ***Julián Martínez Mercado***, *Cristobal Arratia Martínez, Nicolás Mujica Fernández* **Talk 6:** Viscoelastic flow in corotating Couette-Taylor system *Yang Bai, Farid Toumache,* ***Olivier Crumeyrolle***, *Innocent Mutabazi* **Talk 7:** Couette-Taylor flow under a thermoelectric body force in microgravity ***Harunori N. Yoshikawa***, *Olivier Crumeyrolle, Innocent Mutabazi* **Talk 8:** Angular Momentum Transport and Velocimetry in Rayleigh Stable Taylor-Couette Flow ***Hansen Nordsiek***, *Sander G. Huisman, Roeland van der Veen, Chao Sun, Detlef Lohse, Daniel P Lathrop* **Talk 9:** Numerical and experimental studies of bubble dispersion and bubble induced drag modulation in a Turbulent Taylor Couette flow *Agathe Chouippe, G. Fokoua,* ***Céline Gabillet***, *Eric Climent, Catherine Colin, Dominique Legendre*
11:15-11:45	Break	

11:45-13:00	Session 3	**Talk 10:** Scale Invariance at the onset of turbulence in Couette flow ***Liang Shi***, *Marc Avila, Björn Hof* **Talk 11:** Experimental study of Taylor vortex flow in non-Newtonean fluids *Hiroyuki Furukawa,* ***Hiroki Horikoshi***, *Takashi Watanabe* **Talk 12:** Geometric scaling of purely elastic instability in viscoelastic Taylor-Couette flow ***Christof Schaefer***, *Alexander Morozov, Christian Wagner* **Talk 13:** Coherent Structures and Angular Momentum Transportation in Taylor–Couette Flow ***Sedat Tokgöz***, *Gerrit Elsinga, René Delfos, Jerry Westerweel* **Talk 14:** Stability of compressible Taylor-Couette flow ***Michael I. Lipatov***, *Do Xuan Doanh*
13:00-14:00	Lunch Break	
14:00-14:45	Keynote	**Keynote 1:** Turbulence and dynamo action in magnetic Taylor-Couette flow ***Fausto Cattaneo***, *Krista Martocci, Aleksandr Obabko, Paul Fischer*
14:45-15:15	Session 4	**Talk 15:** Symmetry-breaking Hopf bifurcations to 1-, 2-, and 3-tori in small-aspect-ratio counter-rotating Taylor-Couette flow ***Sebastian Altmeyer***, *Juan M. Lopez, Francisco Marques, Y. Do* **Talk 16:** Convection pattern formations in an internally heated layer with background rotation ***Yuji Tasaka***, *Yudai Yamaguchi, Yuichi Murai, Takatoshi Yanagisawa*
15:15-15:45	Break	
15:45-17:00	Session 5	**Talk 17:** Turbulent spots in channel: from transient growth to self sustainability ***Gregoire Lemoult***, *Jean-Luc Aider, José Eduardo Wesfreid* **Talk 18:** Characterising localised intermittent bursts in a narrow gap Taylor-Couette setup ***Shreyas V. Jalikop***, *Kerstin Avila, Paul Steffen, Björn Hof* **Talk 19:** Symmetry related slow processes in parallel shear flows *Tobias Kreilos,* ***Bruno Eckhardt*** **Talk 20:** Turbulent states in Couette-Taylor flow without curvature ***Matthew Salewski***, *Bruno Eckhardt* **Talk 21:** Microscopic investigation of particle dynamics in rotating coaxial cylinders: seamless multi-scale simulations of computation fluid dynamics (CFD) and dissipative particle dynamics (DHD) ***Albert S. Kim***, *Hyun Ah Son, Sungsu Lee, Hyun J. Kim*
17:00-17:30	Break	

17:30-18:45	Session 6	**Talk 22:** Electrohydrodynamic instability in a dielectric fluid between two vertical walls: numerical study ***Mireille Tadie Fogaing***, *Olivier Crumeyrolle, Innocent Mutabazi* **Talk 23:** Convection patterns in a spherical fluid shell under microgravity conditions ***Fred Feudel***, *Laurette S. Tuckerman, Christoph Egbers* **Talk 24:** Taylor-Tayler interactions in hydromagnetic TC flows ***Marcus Gellert***, *Günther Rüdiger* **Talk 25:** Variety of flow regimes in Taylor-Couette-Poiseuille flow *Magdalena Kristiawan, A. Faye, Mohamed Mahloul , A. Mahamdia ,* ***Vaclav Sobolík*** **Talk 26:** Experiments on the subcritical phase transition between decaying and spreading turbulence ***Kerstin Avila***, *Paul Steffen, Björn Hof*

Tuesday 25 June 2013

08:15-09:00	Keynote	**Keynote 2:** Rotating Filtration: A Practical Application of Taylor Couette Flow ***Richard M. Lueptow***
09:00-09:30	Break	
09:30-11:00	Session 7	**Talk 27:** Nonlinear rotating waves in Taylor-Couette flow without inner cylinder rotation ***Kengo Deguchi****, Alvaro Meseguer, Fernando Mellibovsky* **Talk 28:** Inverse cascades sustained by the transfer rate of angular momentum in a 3D turbulent flow *Miguel López-Caballero,* ***Javier Burguete*** **Talk 29:** Complexity in enclosed, centrifugally stable Taylor-Couette flows ***Jan Abshagen****, Matti Heise, Gerd Pfister, Ch. Hoffmann* **Talk 30:** Stratification of Rotating Flow in Vortex Separator ***Sungsu Lee****, Hyun Ah Son, Albert S. Kim, Hyun J. Kim* **Talk 31:** Three-dimensional instabilities in a discretely heated annular flow ***Juan M. Lopez****, Francisco Marques, Marc Avila* **Talk 32:** Intermittent boundary layers and torque maxima in Taylor-Couette flow ***Hannes J. Brauckmann****, Bruno Eckhardt*
11:00-11:30	Break	
11:30-12:45	Session 8	**Talk 33:** Topological switching of vortex arrays caused periodically in a vertical bubbly Taylor-Couette flow ***Yuichi Murai****, Yuji Tasaka, Koji Yoshida, Yasushi Takeda* **Talk 34:** Destabilization via suction of Couette-Taylor flow ***Tommy Dessup****, Laurette S. Tuckerman* **Talk 35:** On the behaviour of torque in turbulent wide gap Taylor-Couette flow *Sebastian Merbold,* ***Christoph Egbers*** **Talk 36:** Scale separation and laminar-turbulent patterns in subcritical shear flows ***Yohann Duguet****, Philipp Schlatter* **Talk 37:** Out of phase modulation of Taylor-Couette flow with viscoelastic fluid ***Mehdi Riahi****, Said Aniss, Mohamed Touhami Ouazzani, Skali Lami Sallah*
12:45-13:45	Lunch Break	

13:45-15:00	Session 9	**Talk 38:** Nonlinear dynamo action in a short Couette-Taylor set-up ***Caroline Nore**, Francky Luddens, R. Laguerre, J. Léorat, Jean-Luc Guermond* **Talk 39:** The large-scale circulation in turbulent Rayleigh–Bénard convection in an aspect ratio 1 cell at large Rayleigh numbers ***Dennis P.M. van Gils**, Xiaozhou He, Guenter Ahlers, Eberhard Bodenschatz* **Talk 40:** Instability of thermal plumes driven by localized heating ***Francisco Marques**, Juan M. Lopez* **Talk 41:** Taylor, Tayler, Velikhov: Tailored experiments on the interaction of rotating fluids and magnetic fields ***Frank Stefani**, Vladimir Galindo, Marcus Gellert, Gunter Gerbeth, Thomas Gundrum, Rainer Hollerbach, Oleg Kirillov, Günther Rüdiger, Martin Seilmayer, Norbert Weber, Tom Weier* **Talk 42:** Electromagnetically driven zonal flows in a rotating spherical shell ***Rainer Hollerbach**, Jérôme Noir, Peter Scarfe, Roland Grimmer, Andy Jackson*
15:00-15:30	Break	
15:30-16:30	Session 10	**Talk 43:** Revisiting Stability of Quasi-Keplerian Flow at Large Reynolds Numbers in a New Taylor-Couette Device ***Hantao Ji**, Eric Edlund, Jeremy Goodman* **Talk 44:** Mode competition in cylindrical flows driven by sidewall oscillations ***Carles Panades**, Francisco Marques, Alvaro Meseguer* **Talk 45:** Free surface effect on laminar-turbulent transition regime in the conical Taylor-Couette flow system ***Fatma Yahi**, Yasmina Hamnoune, Ahcene Bouabdallah, N. Latrache, F. Mokhtari* **Talk 46:** Double-layered vortex structure in rotating plane Couette flow ***Masato Nagata***
16:30-17:00	Break	
17:00-18:00	Lab tour	**Meander (ME)** building **27**
18:00-18:30	Break	
18:30-20:00	Dinner	**Faculty Club (FC)** building **42**

Wednesday 26 June 2013

08:15-09:00	Keynote	**Keynote 3:** Jupiter's fluid mechanics studied in laboratory experiments: the stability of the Great Red Spot and the zonal winds generation by tides ***Patrice Le Gal***
09:00-09:30	Break	
09:30-11:00	Session 11	**Talk 47:** Sheet-like and plume-like thermal flow in a spherical convection experiment performed under microgravity ***Birgit Futterer****, Andreas Krebs, Ana-Catalina Plesa, Florian Zaussinger, Rainer Hollerbach, Doris Breuer, Christoph Egbers* **Talk 48:** Rotation Effect by Drag Reduction in a fully turbulent Taylor-Couette flow ***Arnoud J. Greidanus****, René Delfos, Jerry Westerweel* **Talk 49:** Drifting convectons in binary fluid convection ***Isabel Mercader****, Oriol Batiste, Arantxa Alonso, Edgar Knobloch* **Talk 50:** On the reliable estimation of flow statistics with high spatial resolution from PIV measurements ***Sven Scharnowski****, Christian J. Kähler* **Talk 51:** Near-wall velocity measurements with sophisticated PTV methods ***Christian J. Kähler****, Christian Cierpka, Sven Scharnowski* **Talk 52:** An experimental study on the co-existence of topographic waves and baroclinic instability in a differentially heated rotating annulus ***Miklos Vincze****, Uwe Harlander, Christoph Egbers*
11:00-11:30	Break	
11:30-12:30	Poster session	
12:30-13:30	Lunch Break	
13:30-14:45	Session 12	**Talk 53:** Transition to the ultimate regime in turbulent Taylor-Couette flow: numerical simulations ***Rodolfo Ostilla Mónico****, Erwin P. van der Poel, Roberto Verzicco, Siegfried Grossmann, Detlef Lohse* **Talk 54:** Optimal Taylor-Couette Turbulence *Dennis P.M. van Gils, Sander G. Huisman,* ***Siegfried Grossmann****, Chao Sun, Detlef Lohse* **Talk 55:** The Boussinesq approximation in rapidly rotating flows ***Jose M. Lopez****, Francisco Marques, Marc Avila* **Talk 56:** Rheo-ultrasonic imaging of secondary flows in a Taylor-Couette device ***Marc Antoine Fardin****, C. Perge, S. Manneville* **Talk 57:** Torque measurements in Newtonian and non-Newtonian fluids in Couette-Taylor flow ***Borja Martínez-Arias****, Jorge Peixinho, Olivier Crumeyrolle, Innocent Mutabazi*
14:45-15:15	Break	

15:15-16:15	Session 13	**Talk 58:** Effect of a radial temperature gradient on the transition to turbulence in the Couette-Taylor system ***Clément Savaro***, *Arnaud Prigent, Innocent Mutabazi* **Talk 59:** Solitary wave in a Couette-Taylor system submitted to a high temperature gradient *Clément Savaro,* ***Arnaud Prigent***, *Innocent Mutabazi* **Talk 60:** Creating A Couette Flow of Hot, Unmagnetized Plasma for Flow-Driven Magnetohydrodynamic Instability Experiments ***Cami Collins***, *Cary Forest* **Talk 61:** The instability of a hydrodynamically stable rotation law under the presence of a force-free toroidal field ***Günther Rüdiger***, *Marcus Gellert, Ilia Tereshin*
16:15-16:45	Break	
16:45-17:45	Session 14	**Talk 62:** Onset of Taylor vortex flow in the presence of suspension ***Ahmed Daimallah***, *Ahcene Bouabdallah* **Talk 63:** Streamwise-localized solutions at the onset of turbulence in pipe flow ***Marc Avila***, *Fernando Mellibovsky, Nicolas Roland, Björn Hof* **Talk 64:** Influence of end effects on laminar Taylor-Couette flow ***René Delfos***, *Sedat Tokgöz, Arjang Alidai, Gerrit Elsinga, Jerry Westerweel* **Talk 65:** Oblique bands in transitional plane Couette flow, modeling of small and large scales ***Joran Rolland***
17:45-18:00	Closing	

CFTM²
Center for Flow and Transport
Modelling and Measurement

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Brandenburg
University of Technology
Cottbus - Senftenberg

ICTW 19

19th International Couette-Taylor Workshop

June 22–24, 2015, Cottbus

Useful Information & Programme

19th International Couette-Taylor Workshop

June 22–24, 2015

Local Organizing Committee:

(BTU Cottbus – Senftenberg, Germany)

Contact: ictw19@tu-cottbus.de

- Christoph Egbers
- Rodica Borcia
- Uwe Harlander
- Silke Kaschwich
- Andreas Krebs
- Sebastian Merbold
- Andreas Stöckert

Scientific Committee:

- Dwight Barkley, University of Warwick, UK
- Michael Burin, California State University, USA
- Christoph Egbers, BTU, Cottbus, Germany
- Rainer Hollerbach, University of Leeds, UK
- Hantao Ji, Princeton University, USA
- Daniel Lathrop, University of Maryland, USA
- Patrice Le Gal, IRPHE, CNRS-AIX Marseille, France
- Detlef Lohse, University of Twente, The Netherlands
- Juan Lopez, Arizona State University, USA
- Richard M. Lueptow, Northwestern University, USA
- Francisco Marques, UPC, Barcelona, Spain
- Innocent Mutabazi, LOMC, CNRS-University of Le Havre, France
- Yasushi Takeda, Tokyo Inst. Technology, Japan
- Laurette Tuckermann, PMMH, CNRS-EPSCI, Paris, France

Sponsor:

DFG Deutsche Forschungsgemeinschaft

Co-funded by the German Science Foundation (DFG FOR1182)

General Schedule

Monday, June 22	**Tuesday, June 23**	**Wedesday, June 24**
S1. Taylor-Couette 09:00–10:30 **Keynote 1** *D. Lohse*: The phase space of turbulent Taylor-Couette flow	**S6. Taylor-Couette** 08:30–10:00 **Keynote 3** *F. Busse*: New results for the Taylor-Couette system in the small-gap limit	**S10. Taylor-Couette** 08:30–10:00 **Keynote 5** *R. Hollerbach*: Magnetically modulated Taylor-Couette flows
Coffee break 10:30–11:00	Coffee break 10:00–10:30	Coffee break & **Poster Session** 10:00–11:15
S2. Taylor-Couette 11:00–12:15	**S7. Taylor-Couette** 10:30–12:00	**S11. Taylor-Couette** 11:15–12:15
Lunch break 10:30–11:00	Lunch break 11:00–11:30	Lunch break 11:00–11:30
S3. Geophysical flows / Waves 13:30–15:00 **Keynote 2** *U. Achatz*: Baroclinic waves and gravity waves in the differentially heated rotating annulus	**S8. Spherical gap flows** 13:15–14:45 **Keynote 4** *D. Lathrop*: Waves, turbulence and magnetic fields in spherical Couette flow	**S12. Strato-rotating flows** 13:15–14:45 **Keynote 6** *F. Moisy*: What is the energy dissipation rate in rotating turbulence?
Coffee break 15:00-15:30	Coffee break 14:45–15:15	Coffee break 14:45–15:15
S4. Taylor-Couette 15:30–16:30	**S9. Spherical gap flows** 15:15–16:30	**S13. Strato-rotating flows** 15:15–16:45
Coffee break 16:30–16:45	**Guided Tour** **& Conference Dinner** 17:00–23:00 Buses start next to conference location (ZHG) at 17:00	**Closing** 16:45–17:00
S5. Couette flows 16:45–17:45		
Lab Tour & Barbecue 17:45–22:30		

Instructions for Speakers

In the spirit of trouble-free sessions, we kindly request the speakers to transmit a `pdf` file of their beamer presentation **at least two hours** before the talk to the technical team of the ICTW 19.

The technical team is located close to the registration desk.

The transfer of the file can be done using a USB stick or by writing an email to
`ictw19@tu-cottbus.de` .

Registration Fee and Payment

All participants have to pay the registration fee of 300 Euro. If a participant does not register and does not pay the registration fee, we have to remove the presentation from the scientific program, and cannot publish the abstract.

Online registration is possible until June 14, 2015. Payment information for the online registration: All payments must be made in Euro. Payments by bank transfer are accepted. Please transfer the conference fee to the following bank account:

```
Account name:
Landeshauptkasse Land Brandenburg / BTU Cottbus-Senftenberg
Bank: Landesbank Hessen Thueringen (Helaba)
IBAN: DE573005 0000 7110 402950
BIC /SWIFT-Code: WELADEDDXXX
Reason for payment: Please indicate your first and last name followed
                    by the number 1506600000239
                    (e.g. Erika Mustermann 1506600000239)
```

Unfortunately, we are not allowed to accept credit cards due to the regulations of our government. Instead of credit card payment, we kindly request you to pay cash at the onsite registration. An ATM is located in the mensa building (see p. 5).

Participants who did not register until June 14, 2015 must register on-site and pay cash at the registration desk.

Conference Location

```
East  14.3263
North 51.7674
```

The 19th International Couette-Taylor Workshop takes place at the Brandenburg University of Technology, Cottbus, Germany in the **Hörsaal C** of the **ZHG** (Zentrales Hörsaalgebäude) [Lecture Hall C of the Central Auditorium Building].

The **Conference Desk** will be organized in the foyer of this building. It will be open **from 7:45 am to 8:45 am** on all three conference days.

Important Localities on and close to Campus

Mensa & ATM

E 14.3264
N 51.7662

During the three conference days you can have lunch on the upper floor of the mensa. Drinks and smaller dishes like salads, snacks, cakes are available on the ground floor of the mensa and can be consumed there in a coffee shop atmosphere.

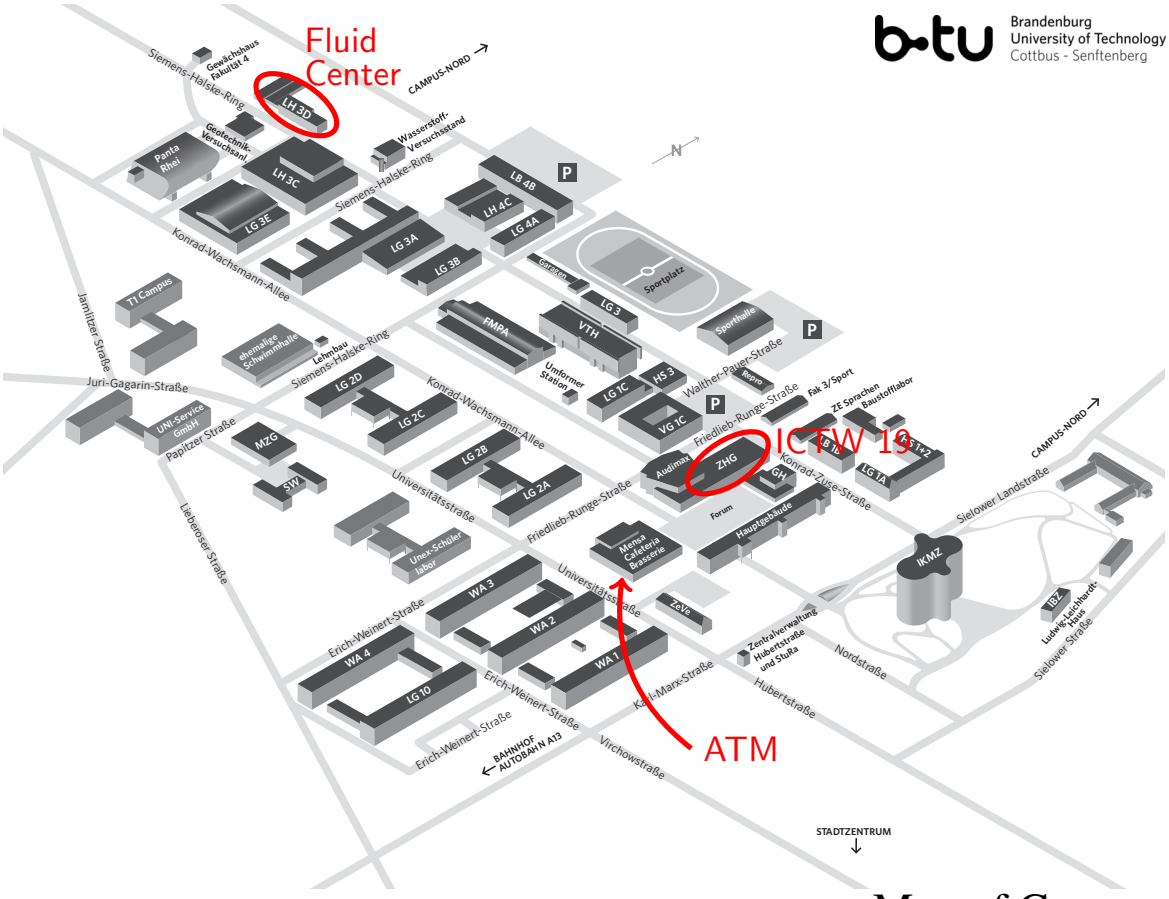
The mensa accepts only cash money.

An ATM of the bank *Sparkasse* is located in mensa building. The entrance door to this ATM is close to the displayed corner of the building.

Fluidzentrum [Fluid Center]

E 14.3188
N 51.7693

In the first evening, we invite you to join us for a tour through the rooms where our experimental facilities are located. Of course, we will present these experiments and we are happy to answer and discuss practical aspects of turbulence measurements. After the lab tour, we have the pleasure to offer you a barbecue next to this site.



Map of Campus

Guided Spreewald Tour & Conference Dinner

On Tuesday, June 23, we invite you for a punt trip in the wonderful universe of water landscape *Spree Forest* . The shuttle buses to the punt haven will start

at 5 pm next to the ZHG [Central Auditorium Building].

Programme

Monday — June 22, 2015

SESSION 1 — Taylor-Couette flows 9:00 – 10:30 **Chair:** Bruno Eckhardt

K 1 09:00 DETLEF LOHSE
The phase space of turbulent Taylor-Couette flow

1.1 09:30 SANDER G. HUISMAN
The boiling Twente Taylor-Couette (BTTC) facility: temperature controlled turbulent flow between independently rotating cylinders

1.2 09:45 ROELAND C. A. VAN DER VEEN
Multiple states in highly turbulent Taylor-Couette flow

1.3 10:00 RUBEN A. VERSCHOOF
High Reynolds number decay of turbulent Taylor-Couette flow

1.4 10:15 JUAN M. LOPEZ
Precession of a rapidly rotating cylinder flow: traverse through resonance

SESSION 2 — Taylor-Couette flows 11:00 – 12:15 **Chair:** Chao Sun

2.1 11:00 BRUNO ECKHARDT
Marginally stable and turbulent boundary layersin low-curvature Taylor-Couette flow

2.2 11:15 SEBASTIAN MERBOLD
Turbulent Taylor-Couette flow of very wide gaps

2.3 11:30 ANDREAS FROITZHEIM
Wide gap Taylor-Couette flow

2.4 11:45 BORJA MARTÍNEZ-ARIAS
Influence of the radius ratio on the torque in turbulent Taylor-Couette flow

2.5 12:00 JOSE M. LOPEZ
Boundary-layer turbulence and optimal boundary conditions in experiments of quasi-keplerian flows

SESSION 3 — Geophysical flows / waves 13:30 – 15:00 **Chair:** Uwe Harlander

K 2 13:30 ULRICH ACHATZ
Baroclinic waves and gravity waves in the differentially heated rotating annulus.

3.1 14:00 WOLF-GERRIT FRÜH
Spectral features of the transition to Structural Vacillation in the baroclinic annulus

3.2 14:15 ANTHONY RANDRIAMAMPIANINA
Inertia gravity waves linked to baroclinic waves in a rotating, differentially heated annulus with an upper free surface

3.3 14:30 THOMAS VON LARCHER
Multiple scales in the thermally driven rotating annulus: time-series data analysis of experiments and numerics

3.4 14:45 ION DAN BORCIA
Inertial wave mode excitation in a liquid bounded by two concentric cylinders

SESSION 4 — Taylor-Couette flows 15:30 – 16:30 **Chair:** Francisco Marques

4.1 15:30 RICHARD M. LUEPTOW
The transition to wavy vortices

4.2 15:45 JAN ABSHAGEN
Symmetry breaking in Taylor-Couette flow with rotating end plates

4.3 16:00 ARNAUD PRIGENT
Stereo-PIV measurements in the subcritical Taylor-Couette flow

4.4 16:15 LEA POKORNY
Stroboscopic two-dimensional ultrasonic velocity profiling for measuring flow transition in Taylor couette systems

SESSION 5 — Couette flows 16:45 – 17:45 **Chair:** Masato Nagata

5.1 16:45 TAKAHIRO ISHIDA
Numerical investigation of high rotation effects on laminar flow in rotating plane Couette flow

5.2 17:00 TAKUYA KAWATA
Experimental Study of Roll-Cell Structure in Laminar Plane Couette Flow under System Rotation

5.3 17:15 LUKASZ KLOTZ
New experiments in shears flows with zero mean velocity

5.4 17:30 ASHLEY P. WILLIS
Structure in the dynamics of turbulent pipe flow revealed by symmetry reduction.

Tuesday — June 23, 2015

SESSION 6 — Taylor-Couette flows 08:30 – 10:00 **Chair:** Richard M. Lueptow

K 3 08:30 FRIEDRICH H. BUSSE
New Results for the Couette-Taylor System in the Small Gap Limit

6.1 09:00 CHRISTOPHER J. CROWLEY
Experimental observations of direct laminar-turbulent transition in counter-rotating Taylor-Couette flow

6.2 09:15 ROMAN O. GRIGORIEV
Numerical investigation of direct laminar-turbulent transition in counter-rotating Taylor-Couette flow

6.3 09:30 PALOMA GUTIERREZ-CASTILLO
Three-dimensional instabilities of the sidewall boundary layer in a rapidly rotating split cylinder

6.4 09:45 YUICHI MURAI
Reciprocal dominance between toroidal liquid vortices and spiral bubble trajectories in a vertical bubbly Taylor-Couette flow

SESSION 7 — Taylor-Couette flows 10:30 – 12:00 **Chair:** Gerd Pfister

7.1 10:30 FRANCISCO MARQUES
Complex dynamics of axially localized states in Taylor Couette flows.

7.2 10:45 BRUNO VAN RUYMBEKE
Mechanisms of toroidal - spiral transitions in Taylor-Couette system with spherical bubbles injection

7.3 11:00 CÉLINE GABILLET
Bubbles induced modifications of the Taylor Vortices

7.4 11:15 OLIVIER CRUMEYROLLE
Drag enhancement in subcritical transition to inertio-elastic flows in the Couette-Taylor system

7.5 11:30 SEYED AMIR BAHRANI
Taylor Couette flow of a non-Newtonian fluid: Influence of shear-thinning effects

7.6 11:45 YANG BAI
Viscoelastic instability in differentially rotating Couette-Taylor system: theory and experiment

SESSION 8 — Spherical gap flows 13:15 – 14:45 **Chair:** Wolf-Gerrit Früh

K 4 13:15 DANIEL P. LATHROP
Waves, turbulence and magnetic fields in spherical Couette flow

8.1 13:45 SANTIAGO ANDRÉS TRIANA
Inertial modes driven by differential rotation in a spherical-Couette configuration

8.2 14:00 MICHAEL HOFF
Experimental study of the fluid flow in a spherical shell induced by librations of the inner sphere: Linear and non-linear features

8.3 14:15 FLORIAN ZAUSSINGER
Convection in the spherical gap with high viscosity contrasts.

8.4 14:30 PHILIPPE BELTRAME
Onset of intermittent octahedral patterns in spherical Bénard convection

SESSION 9 — Spherical gap flows 15:15 – 16:30 **Chair:** Karl Bühler

9.1 15:15 FRED FEUDEL
Multistability in rotating spherical shell convection

9.2 15:30 ANKIT BARIK
Flow instabilities in the Spherical Couette System

9.3 15:45 STANISLAV SUBBOTIN
Inertial waves and flows excited by free inner core in rotating cavity

9.4 16:00 MASATO NAGATA
Convection in a rotating annulus with radial temperature gradient

9.5 16:15 ROGER KHAYAT
Microscale thermal convection

Wednesday — June 24, 2015

SESSION 10 — Taylor-Couette flows 8:30 – 10:00 **Chair:** Juan M. Lopez

K 5 08:30 RAINER HOLLERBACH
Magnetically modulated Taylor-Couette flows

10.1 09:00 MARTIN SEILMAYER
Challenges and recent results of magnetized liquid metal Taylor Couette experiments

10.2 09:15 MARCUS GELLERT
Enhanced viscosity and mixing in TC flows influenced by toroidal magnetic fields

10.3 09:30 ALEJANDRO PAREDES
Mixing of a passive scalar by the instability of a rotating pinch

10.4 9:45 SEBASTIAN ALTMEYER
Transition to turbulence in Taylor-Couette ferrofluidic flow

SESSION 11 — Taylor-Couette 11:15 – 12:15 **Chair:** Michael F. Schatz

11.1 11:15 MARCUS SCHMIDT
Investigation of the Taylor-Couette Flow with Cavitation

11.2 11:30 DENIS POLEZHAEV
Flows and structures in liquid layer inside a rotating horizontal cylinder

11.3 11:45 YUJI TASAKA
Elliptic deformations in rotating free surface flows induced by resonance of waves and quadrupole vortices

11.4 12:00 TORSTEN SEELIG
Study of transitional and turbulent flows in rotor/stator cavities

SESSION 12 — Strato-rotating flows 13:15 – 14:45 **Chair:** Patrice Le Gal

K 6 13:15 FRÉDÉRIC MOISY
What is the energy dissipation rate in rotating turbulence?

12.1 13:45 MARTEN KLEIN
DNS of inertial wave attractors in a librating annular cavity with a height-dependent gap

12.2 14:00 ABOUZAR GHASEMI V.
Mean Flow Generation Mechanisms in a Rotating Annular Cavity with Librating Walls

12.3 14:15 COLIN LECLERCQ
End-effects versus stratification in quasi-Keplerian Taylor–Couette flow

12.4 14:30 ARANTXA ALONSO
Numerical simulation of the genesis of superhighway convection in a slightly inclined layer of a binary liquid mixture

SESSION 13 — Strato-rotating flows 15:15 – 16:45 **Chair:** Innocent Mutabazi

13.4 15:15 NATHANAËL MACHICOANE
Influence of the multipolar order of the source on the viscous decay of inertial waves

13.1 15:30 PATRICE LE GAL
The Barostrat Instability: combining double-diffusive convection and baroclinic instability in a rotating stratified fluid

13.2 15:45 UWE HARLANDER
Stratorotational Instability: nonlinear aspects at higher Reynolds numbers

13.3 16:00 JUNHO PARK
Stratorotational and centrifugal instabilities of the Couette-Taylor flow

13.5 16:15 ANTOINE MEYER
Effect of the centrifugal buoyancy on the stability of Taylor-Couette flow

13.6 16:30 HARUNORI N. YOSHIKAWA
Wave generation in a circular Couette flow in thermoelectric radial buoyancy

POSTER SESSION 10:00 – 11:15

P.1 Flow inversion in small-aspect-ratio counterrotating Taylor-Couette flow

P.2 Streamwise-Localized Solutions with natural 1-fold symmetry

P.3 Spatial distribution and motion of finite-sized particles in turbulent Taylor-Couette flow

P.4 Swirl boundary layer and flow separation at the inlet of a rotating pipe

P.5 The gravity effect on the Taylor-Dean Flow between two horizontal rotating coaxial cones

P.6 Effect of the Working Fluid on the Onset of Taylor Vortices in a Cylindrical Annulus: Analyze and Comparison Between Different Liquids

P.7 Modeling rotating flows in narrow gaps
— Approach towards a general clearance-averaged pressure model

P.8 Absolute and convective instabilities in eccentric Taylor–Couette–Poiseuille flow

P.9 Experimental Investigations of Two Immiscible Fluids and Free Surface Effects in Cylindrical Taylor-Couette Flow

P.10 Hydrodynamic Instability of Liquid Metal Flow in Conical Taylor-Couette System

P.11 The generalized Onsager model for a binary gas mixture with swirling feed

P.12 Harmonic and subharmonic instabilities on modulated Taylor-Couette flow in the limit of low frequency

P.13 Effect of perturbation on turbulence in a gradual expansion pipe flow

P.14 Experimental investigation on the rheology of Non-Brownian dense suspensions

P.15 Effect of the Free Surface in Tilted Conical Taylor-Couette Flow System

P.16 An applied Couette-Taylor system as a simplified bearing model.

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20th International Couette Taylor Workshop

Subject matter

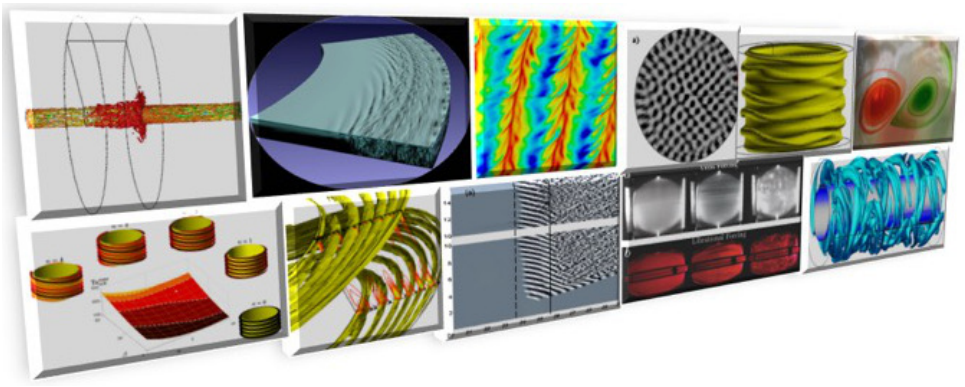
The 20th International Couette-Taylor Workshop will be held in Marseille, France on the Mediterranean coastline, the 11th-13th July 2018. The conference is hosted by Aix-Marseille University, CNRS and Centrale Marseille, on the Château-Gombert campus.

The meeting is devoted to **fundamental problems in fluid mechanics**, with particular emphasis in nonlinear dynamics and flow instabilities.

Selected key-note talks, oral and poster presentations will cover

- **experimental,**
- **theoretical** and
- **computational investigations** on

- Taylor-Couette flows,
- spherical and planar Couette flows,
- Rayleigh-Bénard instability,
- Rayleigh-Taylor instability,
- Dean instability,
- rotating and swirling flows,
- transitional flows,
- shear flows,
- stratified flows,
- geophysical and atmospheric flow instabilities, and
- MHD flows.



INVITED SPEAKERS

Dr. Philippe Ghendrih, Directeur de recherche CEA-Institut de Recherche sur la Fusion Magnétique

Title: Burning plasma turbulence driven by a Rayleigh-Bénard like instability

Prof. Björn Hof, Institute of Science and Technology Austria

Title: Directed percolation transition to turbulence

Prof. Keith Julien, Applied Mathematics, University of Colorado, Boulder

Title: Rotating Rayleigh-Benard Convection: Theory, Experiments and Simulations

Prof. Francisco Marques Applied Physics**,** Universitat Politècnica de Catalunya

Title: Dynamics of thermal plumes in a uniform and a stratified ambient.

Dr. Benoit Pier, Directeur de recherche CNRS LMFA Ecole Centrale Lyon

Title: Complex dynamics in eccentric Taylor-Couette-Poiseuille flow

Main menu
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Invited speakers
Scientific committee
Pratical information and visa
Registration (close)
Final program
Gallery of photos
Book of abstracts

HELP
@ Contact

Scientific committee

International scientific committee (alphabetical order)

- Dwight Barkley, University of Warwick, UK
- Michael Burin, California State University, US
- Christoph Egbers, BTU, Cottbus, Germany
- Rainer Hollerbach, University of Leeds, UK
- Hantao Ji, Princeton University, US
- Patrice Le Gal, IRPHE, CNRS-AIX Marseille, France
- Detlef Lohse, University of Twente, The Netherlands
- Juan Lopez, Arizona State University, US
- Richard M. Lueptow, Northwestern University, US
- Francisco Marques, UPC, Barcelona, Spain
- Innocent Mutabazi, LOMC, CNRS-University of Le Havre, France
- Laurette Tuckerman, PMMH, CNRS-EPSCI, Paris, France

Local organizing committee

- Eric Serre (chair), M2P2, CNRS-Aix-Marseille Univ.-Centrale Marseille
- Patrice Le Gal, IRPHE, CNRS-Aix-Marseille Univ.-Centrale Marseille
- Denis Martinand, M2P2, CNRS-Aix-Marseille Univ.-Centrale Marseille
- Marc Médale, IUSTI, CNRS-Aix-Marseille Univ.
- Stéphane Viazzo, M2P2, CNRS-Aix-Marseille Univ.-Centrale Marseille

20th International Couette -Taylor Workshop
Final Program

July 11 -13 2018; Marseilles, FRANCE

	8:00	9:00	9:30	10:15	10:45	12:15	13:45	15:30	16:00	16:30	18:00	20:00
		Keynotes	Sessions	Break	Sessions	Lunch	Sessions	Break	Keynotes	Sessions		
Wednesday July 11	Opening	B. Pier	TC1		TC2		CPX		P. Ghendrih	MHD		
Thursday July 12		B. Hof	INS1		INS2		TC3		K. Julien	CV		Banquet
Friday July 13		F. Marquez	MIX1		MIX2		GEO	**End ICTW**				

Wednesday, July 11

8:00	Registration	

8:45 – 9:00	Eric Serre	Opening Lecture for the 20th International Couette Taylor Workshop

Poster Session: Workshop duration	
Isabelle Raspo, Stéphane Viazzo, Anthony Randriamampianina, Gabriel Meletti, Uwe Harlander, Torsten Seelig, Andreas Krebs	Low Mach Number Modeling of Stratorotational Instability in a water-filled Taylor-Couette cavity
Sebastian Altmeyer	Alternating `flip' solutions in ferrofluid Taylor-Couette flow
Sebastian Merbold, Uwe Harlander, **Christoph Egbers**	DFG Core Facility Center: Physics of rotating Fluids
Zahia Tigrine, Ahcene Bouabdallah	Experimental and Numerical Modelling of fluid flow between rotating spheres

9:00 – 9:30	*Keynote Lecture 1* Chairman :D. Martinand	**Benoît Pier : Complex dynamics in eccentric Taylor-Couette-Poiseuille flow**

Session : Taylor Couette Flow 1- Chairman : D. Martinand		
9:30 – 9:45	**Richard M. Lueptow,** Denis Martinand, Eric Serre	Taylor Couette Flow with Imposed Radial and Axial Flows - A Weakly Nonlinear Analysis
9:45 – 10:00	**Arnaud Prigent**, Clement Savaro, Innocent Mutabazi	Experimental study of the flow produced in a vertical Taylor-Couette system submitted to a large radial temperature gradient
10:00 – 10:15	**Innocent Mutabazi**, Changwoo Kang, Arnaud Prigent	Numerical investigation of the flow structures in a vertical Taylor-Couette system with a large radial temperature gradient

Coffee Break : 10:15 – 10:45

Session : Taylor Couette Flow 2- Chairman : D. Martinand		
10:45 – 11:00	**Pieter Berghout**, Rick Dingemans, Xiaojue Zhu, Roberto Verzicco, Richard J.A.M. Stevens, Wim van Saarloos, Detlef Lohse	Direct Numerical Simulations of a Finite-Wavelength Modulation within Taylor-Couette Flow
11:00 – 11:15	**Yasushi Takeda**, Lea Pokorny, Erich J. Windhab	Symmetry in Taylor Couette Flow
11:15 – 11:30	**Xiaojue Zhu**, Ruben A. Verschoof, Dennis Bakhuis, Sander G. Huisman, Roberto Verzicco, Chao Sun, Detlef Lohse	Wall roughness induces asymptotic ultimate Taylor-Couette turbulence
11:30 – 11:45	**Konstantin Ilin**, Andrey Morgulis	On the stability of a Couette-Taylor flow between rotating porous cylinders to three-dimensional perturbations
11:45 – 12:00	**Juan M. Lopez**	Subcritical instability of Taylor-Couette flow with stationary inner cylinder
12:00 – 12:15	**Mehdi Riahi**, Said Aniss, Mohamed Ouazzani Touhami	Subharmonic instabilities on modulated Taylor-couette

Lunch : 12:15 – 13:45

Session : Free surface, bubbly and complex flows - Chairman : R. M. Lueptow		
13:45 – 14:00	**Wen Yang**, Ivan Delbende, Yann Fraigneau, Laurent Martin Witkowski	Structures in a rotating flow with free surface: simulations and experiments
14:00 – 14:15	**Harunori Yoshikawa**, Shu Satoh, Christian Mathis	Formation of spiral liquid curtains in a Rayleigh-Taylor system

14:15 – 14:30	**Cecile Lemaitre**, Cherif Nouar, Yao Agbessil, Philippe Marchal, Lionel Choplin	Instability of the Taylor-Couette-Poiseuille flow with radial flux of a shear-thinning fluid
14:30 – 14:45	**Peter Reinke**, Tom Beckmann, Marcus Schmidt	Taylor-Couette Flow with Cavitation
14:45 – 15:00	**Abdelouahab El jaouahiry,** Said Aniss	Effect of amplitude ratio of a quasi-periodic gravitational modulation on the thermal instability in a Hele-Shaw cell
15:00 – 15:15	Antoine Faugaret, **Laurent Martin Witkowski**, Yohann Duguet, Yann Fraigneau	Influence of boundary conditions on instabilities in free surface rotating
15:15 – 15:30	**Hayani Mohamed**, Aniss Said	Stability of a Viscoelastic Pulsed Flow in Taylor Couette Geometry

Coffee Break : 15:30 – 16:00

16:00 – 16:30	*Keynote Lecture 2* Chairman : E. Serre	**Philippe Ghendrih : Burning plasma turbulence driven by a Rayleigh-Bénard like instability**

Session : Magneto - Electro- Dynamics - Chairman : E. Serre		
16:30 – 16:45	**Martin Seilmayer**, Frank Stefani, Thomas Gundrum	Recent Developments of the Liquid Metal Taylor Couette Experiment PROMISE
16:45 – 17:00	**Sebastian Altmeyer**, Younghae Do, Soorok Ryu	Transient behavior between multi-cell flow states in ferrofluidic Taylor-Couette flow
17:00 – 17:15	**Kengo Deguchi**	High-speed standard magneto-rotational instability
17:15 - 17:30	**Yuji Tasaka**, Takatoshi Yanagisawa, Tobias Vogt, Sven Eckert	2D oscillatory convections in a bounded liquid metal layer under an imposed horizontal magnetic field
17:30 – 17:45	**S. Lecheheb**, A. Bouabdallah, Z. Tigrine	Effect of aspect ratio on steady liquid metal through the Gratz system in MHD

Thursday, July 12

9:00 – 9:30	*Keynote Lecture 3* Chairman : P. Le Gal	**Björn Hof : Directed percolation transition to turbulence**

Session : Instability and Transition 1 - Chairman : P. Le Gal		
9:30 – 9:45	**Joran Rolland**	Numerical and theoretical study of extremely rare collapse and build-up of turbulence in stochastic models of wall flows
9:45 – 10:00	**Rodrigo Ezeta**, Sander G. Huisman, Dennis Bakhuis, Sander Bonestroo, Chao Sun, Detlef Lohse	Drag reduction due to vapor bubbles in high-Reynolds number Taylor-Couette
10:00 – 10:15	**Tim Gebler**, Judith Kahle, Martin Oberlack	New non-modal stability analysis and algebraic growth rate of a Taylor Couette model problem in an infinite domain

Coffee Break : 10:15 – 10:45

Session : Instability and Transition 2 - Chairman : P. Le Gal		
10:45 – 11:00	**Alvaro Meseguer**, Francisco Marques, Fernando Mellibovsky, Patrick Weidman	Shear flow instabilities in stretching channels and twisted pipes
11:00 – 11:15	**Eunok Yim**, J.-M. Chomaz, D. Martinand, E. Serre	Transition to turbulence in the rotating disk boundary layer of a rotor-stator cavity
11:15 – 11:30	Ruben A. Verschoof, Dennis Bakhuis, Pim A. Bullee, **Sander G. Huisman**, Chao Sun, Detlef Lohse	The influence of wall roughness on bubble drag reduction in Taylor-Couette turbulence
11:30 – 11:45	**Roger Ayats,** Alvaro Meseguer, Fernando Mellibovsky	On a new family of Tollmien-Schlichting Waves

11:45 – 12:00	**Masato Nagata** Darren P. Wall Takashi Noguchi	Bifurcation in rotating plane Couette revisited
12:00 – 12:15	Giulio Facchini, Benjamin Favier, Meng Wang, Michael Le Bars, **Patrice Le Gal**	The linear instability of the stratified plane Couette flow

Lunch : 12:15 – 13:45

Session : Taylor-Couette Flows 3- Chairman: I. Mutabazi		
13:45 – 14:00	**Michael F. Schatz**, Christopher J. Crowley, Michael Krygier, Roman O. Grigoriev	Exact Coherent Structures in Weakly Turbulent Couette-Taylor Flow: Experiments and Numerics
14:00 – 14:15	**Andreas Froitzheim**, Sebastian Merbold, Christoph Egbers, Rodrigo Ezeta, Detlef Lohse, Chao Sun	Large scale vortices in the Taylor-Couette
14:15 – 14:30	**Pim A. Bullee**, Ruben A. Verschoof, Dennis Bakhuis, Sander G. Huisman, Chao Sun, Rob G. H. Lammertinkand Detlef Lohse	Drag reduction in Taylor-Couette turbulence with a superhydrophobic inner cylinder
14:30 – 14:45	**Yacine Bengana**, Laurette Tuckerman	Spirals, ribbons and RZIF: frequency prediction from mean flows counter-rotating Couette-Taylor flows
14:45 – 15:00	**Denis Martinand**, Nils Tilton	Global modes in Taylor-Couette-Poiseuille flow with a permeable inner cylinder
15:00 – 15:15	**Denni Chaimaa**, Aniss Said, Eljaouahiry Abdelouahab	Instability of a quasi-periodic pulsed Taylor-Couette flow
15:15 – 15:30	Jia Heng Teoh, Rensheng Deng, **Chi-Hwa Wang**	From Bubbles to Cells: A decade of investigation into the phenomenon of object motion in the Taylor-Couette flow

Coffee Break : 15:30 – 16:00		

16:00 – 16:30	*Keynote Lecture 4* Chairman : M. Médale	**Keith Julien : Rotating Rayleigh-Benard Convection: Theory, Experiments and Simulations**

Session : Convection - Chairman : M. Médale		
16:30 – 16:45	**Philipp Gerstner**, Martin Baumann, Vincent Heuveline	Finite element simulation of thermal electro-hydrodynamic driven flow in annular geometry
16:45 – 17:00	**Torsten Seelig**, Marcel Jongmanns, Antoine Meyer, Martin Meier, Christoph Egbers	Onset of dielectrophoretic force-driven convection in annular geometry under Earth's gravity
17:00 – 17:15	**Changwoo Kang**, Innocent Mutabazi	Numerical Study of Thermoelectric Convection in a Finite Cylindrical Annulus
17:15 – 17:30	**Antoine Meyer**, Marcel Jongmanns, Martin Meier, Torsten Seelig, Changwoo Kang, Innocent Mutabazi, Christoph Egbers	Experiments on thermoelectric convection induced in a cylindrical annulus under microgravity conditions
17:30 – 17:45	**Marc Médale,** Bruno Cochelin	A path following algorithm to compute bifurcation diagrams in confined natural convection problems involving Bingham fluids
17:45 – 18:00	**Antoine Meyer,** Harunori Yoshikawa, Innocent Mutabazi, Christoph Egbers	Effect of the dielectrophoretic force in a rigidly rotating cylindrical annulus

Banquet : 20:15

Friday, July 13

9:00 – 9:30	*Keynote Lecture 5* Chairman : S. Viazzo	**Francisco Marques : Dynamics of thermal plumes in a uniform and a stratified ambient**

Session: Mixing, transport and particle laden flows 1 – Chairman : S. Viazzo		
9:30 – 9:45	**Yusuke Ochi**, Takafumi Horie, Naoto Ohmura	Aggregation of silica micro particles in chaotic mixing field
9:45 – 10:00	**Rouae Ben Dhia**, Denis Martinand, Nils Tilton	Dynamics and transport of a solute in Taylor-Couette
10:00 – 10:15	**Kanwar Nain Singh**, Jamie Partridge, Stuart Dalziel, C. P. Caulfield	Quasi-periodic mixing events in two-layer stably-stratified turbulent Taylor-Couette flow

Coffee Break : 10:15 – 10:45

Session: Mixing, transport and particle laden flows 2 – Chairman : S. Viazzo		
10:45 – 11:00	**Madhu V. Majji**, Sanjoy Banerjee, Jeffrey F. Morris	Taylor-Couette Flow of Fluid-Particle Suspension
11:00 – 11:15	**Philipp Brockmann**, Hamid Tabaei Kazerooni, Luca Brandt, Jeanette Hussong	Particle separation in a narrow-gap Taylor-Couette setup
11:15 – 11:30	**Geert Brethouwer**	The effect of spanwise rotation on turbulence and passive scalar transport in channel flow
11:30 – 11:45	**Dennis Bakhuis**, Rodrigo Ezeta, Pim A. Bullee, Raymond H. J. Kip, Sander G. Huisman, Alvaro Marin, Detlef Lohse, Chao Sun	Mayonnaise Taylor-Couette Turbulence

11:45 – 12:00	Hayato Masuda1, Saho Yoshida, Takafumi Horie, **Naoto Ohmura**, Makoto Shimoyamada	Vortex Dynamics in Couette-Taylor Flow with Axial Distribution of Temperature
12:00 – 12:15	Nabila Ouazib, **Yacine Salhi,** El-Khider Si-Ahmed, Jack Legrand, Abdellah Arhaliass, Gérard Degrez	Numerical Simulation of passive scalar transport in turbulent Taylor-Couette Flows in short annulus with rotating outer wall

Lunch : 12:15 – 13:45

Session : Geophysical flows - Chairman : C. Egbers		
13:45 – 14:00	**Stéphane Abide,** Stéphane Viazzo, Isabelle Raspo, Anthony Randriamampianina, Gabriel Meletti, Uwe Harlander, Andreas Krebs	High-Order Compact scheme for High-Performance Computing of stratified rotating flows
14:00 – 14:15	**Gabriel Meletti**, Uwe Harlander, Torsten Seelig, Stéphane Viazzo, Stéphane Abide, Andreas Krebs, Anthony Randriamampianina, Isabelle Raspo	Experimental Confirmation of Linear Stability Results on Stratified Taylor-Couette Flows
14:15 – 14:30	**Christoph Egbers,** Florian Zaussinger, Peter Haun, Peter Canfield, Vadim Travnikov, Andreas Froitzheim	Convection in the spherical gap under micro-gravity conditions: From Earth's mantle to atmospheric
14:30 – 14:45	**Uwe Harlander**, Costanza Rodda, Ion Borcia, P.Le Gal	Gravity waves in baroclinic jet flows : a survey of laboratory experiments
14:45 – 15:00	**Patrice Le Gal**, Raùl Cruz Gomez, Anne Cros	On the coalescence of anticyclones in stratified rotating flows

Coffee and End of Workshop

BOOK of ABSTRACTS

20TH INTERNATIONAL COUETTE TAYLOR WORKSHOP

July 11-13th 2018 - Marseille France

Welcome

Download Flyer here.

The workshop will be **free of charge** and will be held **online** each day **Monday 5th July** to **Friday 9th July 2021** from 13:00–17:00 Central European Time.

Watch back all the talks here on YouTube.

Keynote speakers

Marc Avila (*Uni. of Bremen*)
Christophe Gissinger (*ENS Paris*)
Paloma Gutierrez-Castillo (*Uni. de Málaga*)
Gregoire Lemoult (*Uni. du Havre*
Elena Marensi (*IST Austria*)
Masato Nagata (*Kyoto Uni.*)
Rodolfo Ostilla Monico (*Uni. of Houston*)
Michael Schatz (*Georgia Tech*)

Organisation committee

- Sebastian Altmeyer (Universitat Politècnica de Catalunya, Spain)
- Sander Huisman (University of Twente, The Netherlands)
- Laurette Tuckerman (PMMH ESPCI Paris, France)

Previous ICTW: ICTW 20 Marseille

	5 July 2021	6 July 2021	7 July 2021	8 July 2021	9 July 2021
	Monday	Tuesday	Wednesday	Thursday	Friday
	Turbulence and patterns	Poiseuille and Couette flows	MHD, Spheres, Machine Learning	Geophysical and dynamical systems	Non-Newtonian and Inclusions
13:00–13:15	**Avila**	**Marensi**	**Gutierrez-Castillo**	**Lemoult**	**Nagata**
13:15–13:30					
13:30–13:45	Singh	Yalcin	Furukawa	Sugimoto	López
13:45–14:00	Bullee	Kato	Feudel	Watanabe	Nakagawa
14:00–14:15	Greidanus	Matsukawa	Travnikov	Marques	Horimoto
14:15–14:30	**Break**	**Break**	**Break**	**Break**	**Break**
14:30–14:45					
14:45–15:00	Hamede	Kashyap	Krivonosova	Park	Choujaa
15:00–15:15	Yahi	Mukund	Rojas-Garcia	Viazzo	Tasaka
15:15–15:30	Merbold	Rolland	Perevalov	Vincze	Murai
15:30–15:45	Ntarmouchant	Liu	Kang	Deguchi	Hori
15:45–16:00	Ayats	Prigent	Hiremath	Brethouwer	Blaauw
16:00–16:15	**Break**	**Break**	**Break**	**Break**	**Break**
16:15–16:30	Wang	**Video/Poster Session**	Guseva	Krygier	Yi
16:30–16:45	Jeganathan		Mishra	Pughe-Sanford	Lee
16:45–17:00	Burin		Mamatsashvili	Barthel	Tuliszka-Sznitko
17:00–17:15	**Ostilla-Mónico**		**Gissinger**	**Schatz**	**Social event**
17:15–17:30					

Monday 5 July 2021 - Turbulence and patterns

The times indicated are Central European Summer Time (CEST), corresponding to the timezone of Amsterdam, Paris, and Madrid.

13:00–13:30	**Invited talk 1:** Are Taylor–Couette flow and Rayleigh–Bénard convection twins? Daniel Feldmann, Jóse M. López, Juan Pedro Mellado, Michael Wilczek, **Marc Avila**
13:30–13:45	**Talk 2:** A generalized approach towards a new log law of the wall in Taylor–Couette flows at intermediate Reynolds numbers **Harminder Singh**, Alain Liné, Arnaud Prigent
13:45–14:00	**Talk 3:** Characterisation of rough surfaces in turbulent Taylor–Couette flow **Pim A. Bullee**, Pieter Berghout, Thomas Fuchs, Sven Scharnowski, Christian J. Kähler, Daniel Chung, Detlef Lohse, Sander G. Huisman
14:00–14:15	**Talk 4:** Scaling and riblet drag performance under periodic driven TC flow **Arnoud J. Greidanus**, René Delfos, Jerry Westerweel
14:15–14:45	Break
14:45–15:00	**Talk 5:** Experimental investigation of turbulent counter-rotating Taylor–Couette flows for radius ratio $\eta = 0.1$ **Mohammed Hussein Hamede**, Sebastian Merbold, Christoph Egbers
15:00–15:15	**Talk 6:** Differential heating effect of the outer cone on the laminar-turbulent transition in the conical Taylor–Couette flow. **Fatma Yahi**, Yasmina Hamnoune, Zahia Tigrine, M. A. Hellalbi, Ahcene Bouabdallah
15:15–15:30	**Talk 7:** Turbulent flow structures in centrifugal stable Taylor–Couette flow **Sebastian Merbold**, Mohammed Hussein Hamede, Christoph Egbers
15:30–15:45	**Talk 8:** Patterns of convection in THETACO, the large turbulent thermal Taylor–Couette facility **Ziad Ntarmouchant**, Arnaud Prigent, Innocent Mutabazi
15:45–16:00	**Talk 9:** Stable rotating waves in subcritical counter-rotating Taylor–Couette flows Alvaro Meseguer, Baoying Wang, **Roger Ayats**, Fer Mellibovsky, Kengo Deguchi
16:00–16:15	Break
16:15–16:30	**Talk 10:** Period doubling cascade of subcritical rotating waves in counter-rotating Taylor–Couette flow **Baoying Wang**, Roger Ayats, Alvaro Meseguer, Fer Mellibovsky, Kengo Deguchi
16:30–16:45	**Talk 11:** Controlling secondary flows in Taylor–Couette flow using stress-free boundary conditions **Vignesh Jeganathan**, Kamran Alba, Rodolfo Ostilla-Mónico
16:45–17:00	**Talk 12:** Longitudinal instabilities observed with unsteady outer cylinder motion **Michael J. Burin**
17:00–17:30	**Invited talk 13:** A decade simulating Taylor–Couette **Rodolfo Ostilla-Mónico**

Tuesday 6 July 2021 - Poiseuille and Couette flows

The times indicated are Central European Summer Time (CEST), corresponding to the timezone of Amsterdam, Paris, and Madrid.

13:00–13:30	**Invited talk 14:** Suppressing turbulence in a pipe flow by manipulating the mean velocity profile **Elena Marensi**
13:30–13:45	**Talk 15:** On a new class of oblique 3D modes for plane Couette flow **Alparslan Yalcin**, Yasin Turkac, Martin Oberlack
13:45–14:00	**Talk 16:** Flow instabilities in eccentric Taylor–Couette–Poiseuille flow **Kentaro Kato**, Per-Henrik Alfredsson, Philipp Schlatter, Rebecca J. Lingwood
14:00–14:15	**Talk 17:** Occurrence and disappearance of localized turbulence in Taylor–Couette–Poiseuille flow **Yuki Matsukawa**, Takahiro Tsukahara
14:15–14:45	Break
14:45–15:00	**Talk 18:** Connecting the turbulent and transitional regimes of plane Poiseuille Flow **Pavan V. Kashyap**, Yohann Duguet, Olivier Dauchot
15:00–15:15	**Talk 19:** Breakdown of memorylessness in plane Poiseuille flow **Vasudevan Mukund**, Chaitanya Paranjape, Björn Hof
15:15–15:30	**Talk 20:** Study of collapse of transitional wall turbulence using rare events methods **Joran Rolland**
15:30–15:45	**Talk 21:** Decay of streamwise streaks and rolls in plane Couette-Poiseuille flow **Tao Liu**, Lukasz Klotz, Benoît Semin, Ramiro Godoy-Diana, José Eduardo Wesfreid, Tom Mullin
15:45–16:00	**Talk 22:** Generation and decay of turbulence in Taylor–Couette system Harminder Singh, **Arnaud Prigent**
16:00–16:15	Break

16:15–17:30	**Video 23-1:** A 3D model for the competition between bypass and classical transition **Miguel Beneitez**, Yohann Duguet, Dan S. Henningson **Video 23-2:** Turbulent transition to the ultimate regime in a stochastic model for Rayleigh–Bénard convection with internal sources **Marten Klein**, Alan R. Kerstein, Heiko Schmidt **Poster 23-3:** Localized transitional turbulence and rare events in channel flow **Sébastien Gomé**, Laurette Tuckerman, Dwight Barkley **Poster 23-4:** On the ridge of instability in ferrofluidic Couette flow via alternating magnetic field **Sebastian A. Altmeyer** **Video 23-5:** Generation of thermoelectric convection instabilities in a dielectric fluid layer **Elhadj Boubacar Barry**, Changwoo Kang, Harunori N. Yoshikawa, Innocent Mutabazi **Poster 23-6:** Laboratory experiments on thermo-electro-hydrodynamic convection. Martin Meier, **Antoine Meyer**, Philipp Gerstner, Vincent Heuveline, Christoph Egbers **Video 23-7:** Adjoint sensitivity analysis for thermo-electro-hydrodynamic convection **Philipp Gerstner**, Antoine Meyer, Jonas Roller, Martin Meier, Christoph Egbers, Vincent Heuveline **Poster 23-8:** Extreme events in a polar warming scenario — a laboratory study Costanza Rodda, **Uwe Harlander**, Miklos Vincze **Poster 23-9:** Shift of the instability limit in a wide spherical layer in the presence of time-dependent rotation **Olga Krivonosova**, Dmitry Zhilenko **Poster 23-10:** Experimental and numerical modelling of fluid flow between rotating spheres **Zahia Tigrine**, Fatma Yahi, Maamer Ouali, Sabrina Lecheheb, Faiza Mokhtaria, Ahcene Bouabdallah **Video 23-11:** Bubble-induced convection in a horizontal liquid layer **Harunori N. Yoshikawa**, Kotaro Nakamura, Yuji Tasaka, Yuichi Murai **Video 23-12:** Practical Unpredictability of Bubble Evolution in a Depth-Perturbed Hele-Shaw Channel **Jack Lawless**, Antoine Gaillard, Jack Keeler, Alice Thompson, Andrew Hazel, Anne Juel **Video 23-13:** Wave breaking of a forced stratified shear layer **Jason Yalim**, Bruno D. Welfert, Juan M. Lopez, Matthew Ryan Buchta **Video 23-14:** A simple model for arbitrary pollution effects on swirling free-surface flows **Antoine Faugaret**, Yohann Duguet, Yann Fraigneau, Laurent Martin Witkowski **Poster 23-15:** Advective flow of a rotating horizontal fluid layer in an oscillatory field **Konstantin G. Shvarts**

Wednesday 7 July 2021 - MHD, Spheres, Machine Learning

The times indicated are Central European Summer Time (CEST), corresponding to the timezone of Amsterdam, Paris, and Madrid.

13:00–13:30	**Invited talk 24:** Dynamics in an imperfectly counter-rotating split cylinder flow **Paloma Gutierrez-Castillo**, Juan M. Lopez
13:30–13:45	**Talk 25:** Study on Identification of Taylor Vortex Development Process through Deep Learning Hiroyuki Furukawa, **Kensuke Matsuoka**, Takashi Watanabe
13:45–14:00	**Talk 26:** Bifurcations in rotating spherical shell convection under the influence of differential rotation **Fred Feudel**, Ulrike Feudel
14:00–14:15	**Talk 27:** Stability analysis of the atmosphere-like flows in the spherical gap **Vadim Travnikov**, Christoph Egbers
14:15–14:45	Break
14:45–15:00	**Talk 28:** Numerical study of noise influence on Spherical Couette flow **Olga Krivonosova**, Dmitry Zhilenko
15:00–15:15	**Talk 29:** Experimental study of rough spherical Couette flows **Ruben Rojas-Garcia**, Artur Perevalov, Daniel Lathrop
15:15–15:30	**Talk 30:** Machine learning predictions of high Reynolds number rotating MHD turbulence **Artur Perevalov**, Ruben E. Rojas, Brian R. Hunt, Daniel Lathrop
15:30–15:45	**Talk 31:** Flow Instability of a Dielectric Liquid inside a Cylindrical Annulus with a Solid-Body Rotation **Changwoo Kang**, Antoine Meyer, Harunori N. Yoshikawa, Innocent Mutabazi
15:45–16:00	**Talk 32:** Linear stability analysis of a ferrofluid in a radially heated vertical cylindrical annulus with an applied magnetic field. **Anupam Hiremath**, Antoine Meyer, Innocent Mutabazi
16:00–16:15	Break
16:15–16:30	**Talk 33:** Modal structure of magnetized Taylor–Couette flow **Anna Guseva**, Steven Tobias
16:30–16:45	**Talk 34:** Convective, absolute and global azimuthal magnetorotational instability **Ashish Mishra**, George Mamatsashvili, Vladimir Galindo, Frank Stefani
16:45–17:00	**Talk 35:** A new type of double-diffusive helical magnetorotational instability in rotating flows with positive shear **George Mamatsashvili**, Frank Stefani, Rainer Hollerbach, Günther Rüdiger
17:00–17:30	**Invited talk 36:** Angular momentum transport in electrically-conducting fluids **Christophe Gissinger**

Thursday 8 July 2021 - Geophysical and dynamical systems

The times indicated are Central European Summer Time (CEST), corresponding to the timezone of Amsterdam, Paris, and Madrid.

13:00–13:30	**Invited talk 37:** Laminar to turbulent transition in Taylor–Couette flows **Grégoire Lemoult**, Lukasz Klotz, Björn Hof
13:30–13:45	Break
13:45–14:00	**Talk 38:** Free Surface Motion of Viscous Fluid Circulating between Vertical Rotating Cylinders **Takashi Watanabe**, Yorinobu Toya, Hiroyuki Furukawa
14:00–14:15	**Talk 39:** Stratified Taylor–Couette flow: Nonlinear dynamics **Francisco Marques**, Juan M. Lopez
14:15–14:45	Break
14:45–15:00	**Talk 40:** Experiments on instabilities and transition to turbulence in stratified Taylor–Couette flow **Junho Park**, Paul Billant, Jong-Jin Baik, Jaemyeong Mango Seo
15:00–15:15	**Talk 41:** Small-scales riding on the jet front of baroclinic waves in an atmospheric-like differentially heated rotating annulus **Stéphane Viazzo**, Stéphane Abide, Rodica Borcia, Isabelle Raspo, Andreas Krebs, Uwe Harlander, Anthony Randriamampianina
15:15–15:30	**Talk 42:** Climate impact of the Drake Passage opening: lessons from a minimalistic laboratory experiment **Miklos Vincze**, Matyas Herein, Tamas Bozoki, Ion Dan Borcia, Uwe Harlander, Costanza Rodda
15:30–15:45	**Talk 43:** Asymptotic scalings of equilibrium solutions in Taylor–Couette flow **Kengo Deguchi**
15:45–16:00	**Talk 44:** Much faster heat/mass than momentum transport in rotating Couette flows **Geert Brethouwer**
16:00–16:15	Break
16:15–16:30	**Talk 45:** Exact coherent structures and shadowing in turbulent Taylor–Couette flow **Michael C. Krygier**, Joshua Pughe-Sanford, Roman O. Grigoriev
16:30–16:45	**Talk 46:** Does Periodic Orbit Theory extend to turbulent Taylor–Couette flow? **Joshua Pughe-Sanford**, Michael C. Krygier, Roman O. Grigoriev
16:45–17:00	**Talk 47:** On the transition from weakly to fully nonlinear Taylor vortex flow **Benedikt Barthel**, Xiaojue Zhu, Beverley McKeon
17:00–17:30	**Invited talk 48:** Turbulence in a Taylor–Couette experiment shadows exact coherent structures Christopher J. Crowley, Joshua Pughe-Sanford, Wesley Toler, Michael C. Krygier, Roman O. Grigoriev, **Michael F. Schatz**

Friday 9 July 2021 - Non-Newtonian and Inclusions

The times indicated are Central European Summer Time (CEST), corresponding to the timezone of Amsterdam, Paris, and Madrid.

13:00–13:30	**Invited talk 49:** Couette–Taylor flow in the limit of narrow gap vs. rotating plane Couette flow **Masato Nagata**
13:30–13:45	**Talk 50:** Vortex merging and splitting events in viscoelastic Taylor–Couette flow **Jóse M. López**
13:45–14:00	**Talk 51:** Effect of rheological properties on Couette-Taylor flow with axial temperature distribution **Kanta Nakagawa**, Hayato Masuda, Hiroyuki Iyota
14:00–14:15	**Talk 52:** Taylor–Couette turbulence modified by the viscoelasticity of fluid in co-rotation and counter-rotation regimes **Yasufumi Horimoto**, Taisei Hayama
14:15–14:45	Break
14:45–15:00	**Talk 53:** The DNS study of bifurcation phenomena in a short annulus with rotating end-walls at low Re **Ewa Tuliszka-Sznitko**
15:00–15:15	**Talk 54:** A novel rheometry based on oscillating circular Couette flow in a cylindrical vessel **Yuji Tasaka**, Taiki Yoshida, Kohei Ohie, Yuichi Murai
15:15–15:30	**Talk 55:** New mode appearance by bubble injection in Taylor–Couette flow **Yuichi Murai**, Yuji Tasaka, Yoshihiko Oishi, Yasushi Takeda
15:30–15:45	**Talk 56:** Interfacial-dominated torque response in multi-phase Taylor–Couette flows **Naoki Hori**, Chong Shen Ng, Roberto Verzicco, Detlef Lohse
15:45–16:00	**Talk 57:** Bubbly drag reduction in saline water **Luuk J. Blaauw**, Detlef Lohse, Sander G. Huisman
16:00–16:15	Break
16:15–16:30	**Talk 58:** Global and local statistics in turbulent emulsions **Lei Yi**, Federico Toschi, Chao Sun
16:30–16:45	**Talk 59:** Particle-laden highly turbulent counter-rotating Taylor–Couette flow **You-An Lee**, Simen T. Bootsma, Sander G. Huisman
16:45–17:00	**Talk 60:** Stability of an oscillatory Taylor–Couette flow in an upper convected Maxwell fluid Mohamed Hayani Choujaa, **Mehdi Riahi**, Said Aniss
17:00–17:30	Social event

22nd International Couette-Taylor Workshop

Barcelona, Spain | 28 - 30 June 2023

Welcome to the 22nd edition of the International Couette Taylor Workshop (ICTW23), to be held in Barcelona (28th-30th June 2023), hosted by UPC. In this edition, we celebrate the centennial of the publication of G.I. Taylor's paper entitled 'Stability of a Viscous Liquid contained between Two Rotating Cylinders', Phil. Trans. Roy. Soc. A, 223 (1923). Over a century, this paper has been a cornerstone work on which hydrodynamic stability theory has been developed.

Following the structure of former editions of the ICTW23, the conference will be organized as a series of selected key-note talks, oral and poster presentations, covering experimental, theoretical and computational investigations on hydrodynamic instabilities. The scope of the conference will include (among other **topics**):

Taylor-Couette flows
Rayleigh-Bénard instabilities (thermal buoyancy, binary mixtures, etc.)
Rayleigh-Taylor and Dean instabilities
Instabilities in wall-bounded shear and boundary layer flows
Stratified flows
Coherent flow structures
Geophysical and atmospheric flow instabilities
MHD flows

We very much look forward to seeing you in Barcelona next year!

The local ICTW23 committee
A. Alonso, J. Curbelo, F. Marques, F. Mellibovsky, A. Meseguer

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- Tobias Schneider (EPFL, Switzerland)
- Eric Serre (Aix-Marseille Université, France)
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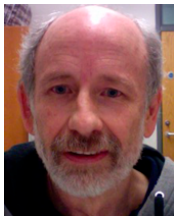
Invited Speakers



Dwight Barkley

University of Warwick, UK

Title: **Theory for turbulent-laminar patterns in Couette flow**

Dwight Barkley is a professor of Mathematics at the University of Warwick. He held postdoctoral positions at Caltech, Princeton, and ENS Lyon. He obtained his PhD in Physics from the University of Texas at Austin. His research lies at the interface of high-performance computation, pattern formation and nonlinear phenomena. In 2005 he was awarded the SIAM J.D. Crawford Prize. He is a Fellow of APS, SIAM, and the IMA.

Edgar Knobloch

UC Berkeley, US

Title: **Instability-driven turbulence**

Edgar Knobloch is a professor of physics at the University of California, Berkeley. He received a BA degree in mathematics from the University of Cambridge and his PhD degree in astronomy from Harvard University. He is a nonlinear dynamicist interested in fluid dynamics and pattern formation. In recent years he has focused in geophysical flows, materials science, and reaction-diffusion systems, with a particular interest in spatially localized structures. He is a Fellow of the American Physical Society and the Society for Industrial and Applied Mathematics.

Laurette Tuckerman

Laboratoire de Physique et Mécanique des Milieux Hétérogènes, CNRS, ESPCI Paris, France

Title: **Couette-Taylor flow: history of a paradigm**

Laurette Tuckerman is a senior researcher at PMMH (Physique et Mecanique des Milieux Heterogenes), an institute affiliated with the CNRS (Centre National de la Recherche Scientifique), ESPCI and Sorbonne University. Prior to this, she was at the University of Texas at Austin and she obtained her bachelors and PhD degrees from Princeton and MIT. She studies hydrodynamic instabilities (such as those in Couette flows, thermal convection, and Faraday waves) using the methods of computational fluid dynamics and of bifurcation theory. She also studies the laminar-turbulent patterns which occur during transition to turbulence in wall-bounded shear flows. She is a Fellow of the American Physical Society and of Euromech. Laurette Tuckerman began her scientific career by studying spherical Couette flow, but eventually branched out to cylindrical (Taylor) and plane Couette flows. She has been attending the ICTW for **40(!) years.**

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ICTW23
Technical Programme

Wednesday, 28/06/2023

Wed, 28/06/2023 08:00 - 09:00
REG 1 - Registration

Wed, 28/06/2023 09:00 - 09:30 — Aula Master UPC
OPC - Opening Ceremony
Chaired by: Prof. Francisco Marques

Wed, 28/06/2023 09:30 - 10:15 — Aula Master UPC
PL I - Invited lecture: Couette-Taylor flow: history of a paradigm
Chaired by: Dr. Alvaro Meseguer (Universitat Politècnica de Catalunya)

Wed, 28/06/2023 10:15 - 10:40
CB - Coffee Break

Wed, 28/06/2023 10:40 - 12:55 — Aula Master UPC
WED 1 - Taylor-Couette flows I
Chaired by: Prof. Laurette Tuckerman (CNRS, ESPCI Paris)

Different Flow State Transition Processes of Taylor–Couette–Poiseuille Flow Based on Taylor Vortex
Y. Matsukawa*, T. Tsukahara

A review on the transition mechanisms to turbulence in rotating disc boundary layers and cavities
E. Serre*, D. Martinand, B. Viaud

On Symmetry breaking of Taylor-Couette System
Y. Takeda*

The influence of rotation on heat and momentum transport in plane Couette and Taylor-Couette flow
G. Brethouwer*

Controlling secondary flows in Taylor-Couette flow using spanwise superhydrophobic surfaces
R. Ostilla-Mónico*, V. Jeganathan, T. Shannak, K. Alba

Study On Discrimination of Mode Development Process of Taylor Vortex Flow Using Various Physical Quantities
H. Furukawa*, T. Yamazaki

Scalings for eccentric Taylor-Couette-Poiseuille flow
K. Kato*, P. Alfredsson, R. Lingwood

Instability of spiral Poiseuille flow with either inner or outer cylinder rotation
P. Brockmann*, V. Vasanta Ram, S. Jakirlic, J. Hussong

Couplings between Taylor vortices and a concentration boundary layer via osmotic pressure
D. Martinand*, N. Tilton

Wed, 28/06/2023 12:55 - 14:10
LB - Lunch Break

Wed, 28/06/2023 14:10 - 15:55 — Aula Master UPC
WED 2 - Geophysical flows and inertial waves
Chaired by: Dr. Patrice Le Gal (CNRS)

Parametrically forced rapidly rotating flows in cuboids
J. Lopez*

New laboratory experiments to study the large-scale circulation and climate dynamics
U. Harlander*, A. Sukhanovskii

On the Role of Arbitrary Pollution Effects on the Stability of Swirling Free-Surface Flows
L. MARTIN WITKOWSKI*, A. FAUGARET, Y. DUGUET, Y. FRAIGNEAU

AtmoFlow: Convection in spherical shell with atmospheric boundary conditions
P. Szabo*, Y. Gaillard, C. Egbers

Stability of oblique liquid curtains with surface tension
E. Benilov*

Instabilities around a Differentially Rotating Spheroid Embedded in a Rotating Stratified Fluid
A. Chauchat*, P. Meunier, M. Le Bars

A New class of higher order schemes for Navier-Stokes equations and application in rotating flows
K. Wu*

Wed, 28/06/2023 15:55 - 16:25
CB - Coffee Break

Wed, 28/06/2023 16:25 - 18:25 Aula Master UPC

WED 3 - Instabilities in wall-bounded shear and boundary layer flows

Chaired by: Dr. Ashley Willis (University of Sheffield)

How do laminar-turbulent patterns emerge from turbulent shear flow ?
Y. Duguet*, P. Kashyap, O. Dauchot

On New Linear Sub-Critical Oblique Modes - an Extension of Squires Theorem for Spatial Instabilities
M. Oberlack*, A. Yalcin, J. Laux

Dynamics of structures in transition to turbulence
J. Wesfreid*, B. Semin, T. Liu, R. Godoy-Diana

On assessing the control of transition to turbulence: the example of plane Couette flow
C. Beaume*, A. Pershin, T. Eaves, K. Li, S. Tobias

Excitation and evolution of compressible Gortler vortices triggered by elevated freestream vortical disturbances
D. Xu*, P. Ricco

Decomposition of the skin-friction coefficient of incompressible and compressible boundary layers
P. Ricco*, D. Xu, L. Duan, M. Skote

Subcritical Dynamics of Axisymmetric Rotor-Stator Flow
A. Gesla*, L. Martin Witkowski, Y. Duguet, P. Le Quéré

Reproducing Spatio-Temporal Intermittency of Turbulent Puffs with Domany–Kinzel Model
K. Kohyama*, T. Tsukahara

Wed, 28/06/2023 20:10 - 20:25 Sala Enric Prat de la Riba IEC (Insitut d'Estudis Catalans)

SPS - Taylor's 1923 Paper in the Philosophical Transactions - A Centennial Retrospective

Chaired by: Prof. Francisco Marques

Taylor's 1923 Paper in the Philosophical Transactions -- A Centennial Retrospective
R. Lueptow*, R. Hollerbach, E. Serre

Wed, 28/06/2023 20:25 - 22:30 Sala Enric Prat de la Riba IEC (Insitut d'Estudis Catalans)

WR - ICTW: Welcome reception

Thursday, 29/06/2023

Thu, 29/06/2023 08:00 - 09:00
REG 2 - Registration

Thu, 29/06/2023 09:00 - 09:45 Aula Master UPC
PL II - Invited lecture: Instability-driven turbulence
Chaired by: Prof. Isabel Mercader (Universitat Politecnica de Catalunya)

Thu, 29/06/2023 09:45 - 10:30 Aula Master UPC
THU 4 - Taylor-Couette flows: turbulence
Chaired by: Dr. José Eduardo Wesfreid (ESPCI/CNRS)

On high Taylor number Taylor vortices in Taylor-Couette flow
K. Deguchi*

Growing particles in Taylor–Couette turbulence
S. Huisman*, L. Blaauw, D. Lohse

Heat transport and friction losses in rapid rotating electrical machinery
S. Merbold*, K. Jani, S. de Graaf, L. Enghardt, C. Egbers

Thu, 29/06/2023 10:30 - 10:55
CB - Coffee Break

Thu, 29/06/2023 10:55 - 12:55 Aula Master UPC
THU 5 - Thermal convection I
Chaired by: Prof. Edgar knobloch (UC Berkeley)

Multiple states in turbulent large-aspect-ratio thermal convection: What determines the number of rolls?
O. Shishkina*, D. Lohse, Q. Wang, R. Verzicco

Solitary-like and modulated wavepackets in the Couette-Taylor with a radial temperature gradient
C. Kang*, H. Yoshikawa, Z. Ntarmouchant, A. Prigent, I. Mutabazi

A computational local reduced-order method for a Rayleigh-Benard problem
H. Herrero*, J. Cortés, F. Pla

Novel localized states in binary uid convection in slightly inclined rectangular cells
O. Batiste*, A. Alonso, I. Mercader

GeoFlow vs. AtmoFlow: Numerical results
V. Travnikov*, C. Egbers

Local instabilities of a circular Couette flow in a vertical annulus with a radial heating
O. Kirillov*, I. Mutabazi

Rayleigh-Bénard convection rolls determine the shape evolution of an ice block melting from below
D. Lohse*, R. Yang, C. Howland, H. Liu, R. Verzicco

Thu, 29/06/2023 12:55 - 14:10
LB - Lunch Break

Thu, 29/06/2023 14:10 - 15:55 Aula Master UPC
THU 6 - Stratified flows
Chaired by: Prof. Juan Lopez (ASU)

On the wanderings of a ludion in a corral: in search of a quantum analogy
P. Le Gal*, B. Castillo Morales, S. Hernandez-Zapata, G. Ruiz Chavarria

Superharmonic and Triadic Resonances in a Horizontally Oscillated Stratified Cavity
J. Yalim*, B. Welfert, J. Lopez

Effect of thermal diffusion on instabilities of stratified shear flows
J. Park*, S. Mathis

The stratified Keplerian turbulence
X. Zhu*, A. Bhadra

Influence of heat transfers at the free surface of a thermally-driven rotating annulus
S. Abide*, I. Raspo, U. Harlander, S. Viazzo, A. Randriamampianina, G. Meletti

A parameter study of strato-rotational low-frequency modulations: impacts on momentum transfer and energy distribution
G. Meletti*, S. Abide, U. Harlander, S. Viazzo

Decay of Mechanically Driven Axial Counter-current in a High Speed Rotating Cylinder Using DSMC Simulation
S. Pradhan*

Thu, 29/06/2023 15:55 - 16:25
CB - Coffee Break

Thu, 29/06/2023 16:25 - 17:10 Aula Master UPC

THU 7a - Thermal convection II

Chaired by: Dr. Olga Shishkina (Max Planck Institute for Dynamics and Self-Organization)

A Schwarz Domain Decomposition Method with Legendre Collocation Applied to the Rayleigh-Bénard Convection Problem
D. Martínez*, H. Herrero, F. Pla

Convection in Salt Lakes
M. Threadgold*, C. Beaume, L. Goehring, S. Tobias

Asymptotic Ultimate Regime of Homogeneous Rayleigh-Bénard Convection on Logarithmic Lattices
B. Amaury*, D. Bérengère

Thu, 29/06/2023 17:10 - 18:25 Aula Master UPC

THU 7b - Viscoelastic flows

Chaired by: Prof. Björn Hof (IST Austria)

Coherent Structures in Elasto-Inertial Taylor Couette Flows
T. Boulafentis*, T. Lacassagne, N. Cagney, S. Balabani

Instability modes in viscoelastic Taylor-Couette flows with different rotation regimes
I. Mutabazi*

Transitions in Taylor-Couette flow of concentrated non-colloidal suspensions
C. Kang*, P. Mirbod

Drag modification by surfactant additives in high Reynolds-number Taylor-Couette turbulence
Y. Horimoto*, H. Okuyama, T. Hayama

Direct numerical simulation of viscoelastic turbulent Taylor-Couette flow
J. Song*, N. Liu, X. Lu, B. Khomami

Thu, 29/06/2023 20:10 - 23:00 Hotel Casa Fuster

GD - ICTW: Gala Dinner

Friday, 30/06/2023

Fri, 30/06/2023 08:00 - 09:00
REG 3 - Registration

Fri, 30/06/2023 09:00 - 09:45 Aula Master UPC
PL III - Invited lecture: Theory for turbulent-laminar patterns in Couette flow
Chaired by: Dr. Fernando Mellibovsky (Universitat Politècnica de Catalunya)

Fri, 30/06/2023 09:45 - 10:30 Aula Master UPC
FRI 8 - Miscelanea
Chaired by: Prof. Masato Nagata (Kyoto University)

Receptivity of Compressible Boundary Layers on Flat and Concave Porous Surfaces
L. Fossa*, P. Ricco

Nonlinear instability of a wide-gap spherical Couette flow in the presence of weak noise
O. Krivonosova, M. Gritsevich, **O. Ivanov***, D. Zhilenko

Rotating spherical Shell Convection under the Influence of an imposed differential Rotation
F. Feudel*, U. Feudel

Fri, 30/06/2023 10:30 - 10:55
CB - Coffee Break

Fri, 30/06/2023 10:55 - 12:55 Aula Master UPC
FRI 9 - Electro and magneto hydrodynamic flows
Chaired by: Dr. Kengo Deguchi (Monash University)

Experimental observation of the standard magnetorotational instability in a modified Taylor-Couette cell
Y. Wang*, E. Gilson, F. Ebrahimi, J. Goodman, H. Ji

MHD Turbulent Taylor-Couette Flow with End Walls in Axial Magnetic Field
H. Kobayashi*, T. Hasebe, T. Fujino, H. Takana

Thermomagnetic instability of a ferrofluid Couette flow under a magnetic field in Rayleigh-stable regimes
A. HIREMATH*, A. MEYER, I. MUTABAZI

Ferrofluidic wavy Taylor vortices under alternating magnetic field
S. Altmeyer*

Nonlinear Evolution of Magnetorotational Instability in a Magnetized Taylor-Couette Flow: Scaling Properties and Relation to Upcoming DRESDYN-MRI Experiment
A. Mishra*, G. Mamatsashvili, F. Stefani

Impact of varying nutation angles on precessional flow inside a cylinder
K. Vivaswat*, F. Stefani, T. Gundrum, F. Pizzi, A. Giesecke, M. Ratajczak

A Taylor-Couette experiment with inner rotating cylinder and applied dielectrophoretic force
A. Meyer*, J. Roller, R. Stöbel, V. Heuveline, C. Egbers

Numerical simulation of Taylor-Couette flow under dielectrophoretic force
J. Roller, **A. Meyer***, R. Stöbel, C. Egbers, V. Heuveline

Fri, 30/06/2023 12:55 - 14:10
LB - Lunch Break

Fri, 30/06/2023 14:10 - 15:55 Aula Master UPC
FRI 10 - Taylor-Couette flows II
Chaired by: Prof. Richard Lueptow (Northwestern University)

Nonlinear axisymmetric Taylor-Couette flow between counter-rotating cylinders in the narrow gap limit
M. Nagata*

Longitudinal instability in start-stop Taylor-Couette flow
A. Willis*, M. Burin

Self-sustained Coherent Structures Underlying Spiral Turbulence in Taylor–Couette Flow
B. Wang*, R. Ayats, K. Deguchi, F. Mellibovsky, A. Meseguer

Feigenbaum cascades and one dimensional map reduction in subcritical Taylor-Couette flow
R. Ayats*, B. Wang, K. Deguchi, F. Mellibovsky, A. Meseguer

Angular momentum transport in a very wide gap TC geometry $\eta = 0.1$.
M. Hamede*, S. Merbold, C. Egbers

The effects of salinity on bubbly drag reduction in turbulent Taylor–Couette flow
L. Blaauw*, D. Lohse, S. Huisman

Effects of large-scale circulation on two-fluid turbulent Taylor–Couette flows
N. Hori*, H. Liu, D. Lohse, R. Verzicco

Flow field statistics of the supercritical turbulent spiral in counter-rotating Taylor-Couette flow
F. Mellibovsky*, B. Wang, R. Ayats, A. Meseguer, K. Deguchi

Fri, 30/06/2023 15:55 - 16:25
CB - Coffee Break

Fri, 30/06/2023 16:25 - 18:25 Aula Master UPC

FRI 11 - Coherent flow structures

Chaired by: Mr. Dwight Barkley (University of Warwick)

The effect of curvature and centrifugal forces on the transition in pipe flow
B. Hof*, Y. Zhuang, V. Mukund

Robust methods for constructing periodic orbits in wall-bounded shear flows
O. Ashtari*, Z. Zheng, T. Schneider

Localized layers of turbulence in stratified horizontally sheared Poiseuille flow
P. Le Gal*, J. Labarbe, U. Harlander, S. Le Dizes, B. Favier

Direct path from turbulence to time-periodic solutions
G. Yalnız*, C. Paranjape, Y. Duguet, N. Budanur, B. Hof

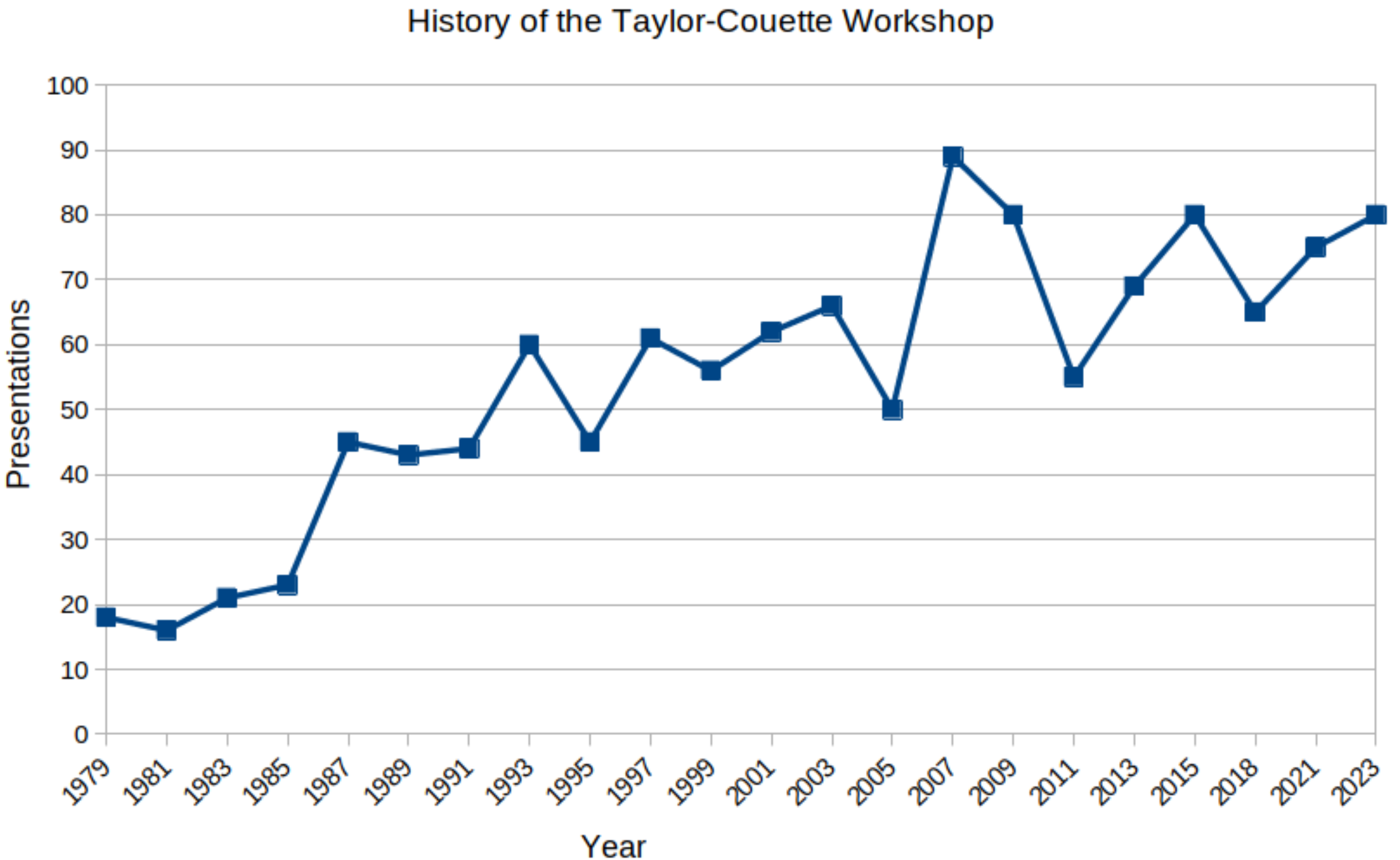
Laminarising Turbulence by Minimising Transient Growth
S. Chu*, A. Willis, E. Marensi

Search for Unstable Relative Periodic Orbits in Plane Poiseuille Flow using Symmetry-Reduced Dynamic Mode Decomposition
M. Engel*, O. Ashtari, T. Schneider, M. Linkmann

Regularized four-sided Cavity Flows: A spectral Bifurcation Benchmark implemented in Julia
M. Waldleben*, Á. Meseguer, O. Batiste, A. Alonso

Fri, 30/06/2023 18:10 - 18:30 Aula Master UPC

CC - Closing Ceremony


History of the Taylor-Couette Workshop
Presentations
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